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Statesmanship

THE militant group of old guard New Dealers that served as a board of strategy for the President during the campaign believes that it has the right formula for campaign success. Moreover it holds that the election constitutes a mandate "to implement" the Democratic position on the issues of the campaign. This group is entitled to the considerable satisfaction which accrues to any contestant in a hard-fought struggle who comes out on top after all the experts had allotted him six feet of turf and a sharp spade. The wise winner in such a contest will examine carefully the implications of his victory. Particularly is this true where the welfare of 140 million people is at stake and the rest of the world looks to this leadership, confirmed in power by a popular election for the first time, to guide it through a tense and explosive postwar period.

President Truman and his entourage are confronted by a challenge which will test his statesmanship. We do not mean by this merely the skill with which he handles his diplomatic tasks. That is certainly a part of this higher quality of leadership. We mean also the tolerance and understanding with which he approaches domestic problems that may affect our entire future. In this he can well afford to take a page from the campaign position of his defeated adversary. Dewey did appeal for unity, the elimination of class jealousies, and national teamwork in promoting domestic harmony and continued material progress.

The President would be well advised to avoid the temptation "to rub it in." A large element in the South chose to abandon him on the issue of state rights. Fortunately for Truman this defection did not prove fatal to his candidacy. It is likewise true that a preponderant majority of the business and financial groups hoped that the election would place a period on the New Deal and bring a revision in national policies. Whether such an attitude is reactionary, as some of the more effervescent and exultant retainers of the President charged, is beside the point.

The fact is that the million voters who cast their ballots for Governor Thurmond contain many of the leading citizens of the South and that their program of state rights contains a political principle which the founders of this government considered necessary in an enduring democracy. If Harry Truman has the vision to look through and beyond the next four years he will try to accommodate the valid ingredient in the state rights case and reject the proscription of these dissidents which some of his advisers are urging.

A similar position might well be taken toward the "economic royalists" who did their best to defeat him. These men represent the business leadership of the country. The great economic power which America now has, a bulwark against the designs of totalitarians and a comfort to the struggling democracies of the west, is due in part to the conspicuous talents which these men have been able to exercise under conditions of freedom. They constitute a national asset which it would be folly to repudiate.

If Truman is big enough, he will use sugar in handling both groups instead of a club.

Joseph Stagg Lawrence

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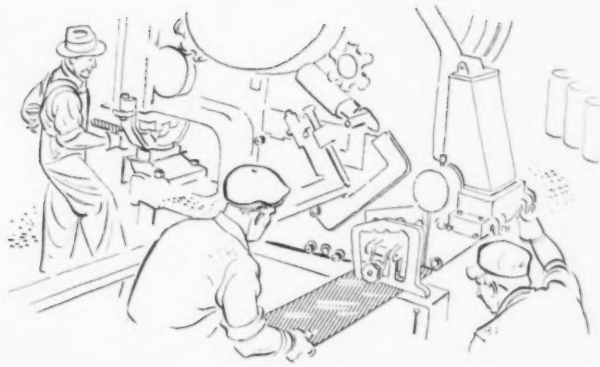

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► The feeling is growing in steel circles that prices for equipment and plant construction comparable with prewar costs are out of the question. The problem of setting aside money for new equipment as the old wears out holds top drawer rank. One steelmaker recently planned an improvement at what he thought was a good estimate—$4 million. By the time planning was completed, the cost was up to $6 million. A short time later it was over $7 million. By the time the job is done he estimates it will cost about $9 million—but it will be carried through.

► Washington sources look for approval of a multi-billion dollar military lend-lease program but they doubt that even quick passage of such an act by Congress would produce more than $500 million in expenditures in 1949. Reason—it would be just as slow starting as our present rearmament program on which equipment expenditures to date have been nominal.

► Wind tunnels that will require up to 1 million hp each are being seriously planned but no adequate power source can be found to provide the 3 million kw contemplated under the program.

► Inland Steel's recent action asking customers to cut back on deliveries if the steel is not actually needed for any given period received a lot of comment. Customers wrote back heartily commending the company for its action, but stated almost to the man "such conditions don't occur with us."

► The big Davenport, Iowa, sheet mill of the Aluminum Co. of America that was to have been in production last March at the latest, has not yet started to roll sheets on a production basis. Shortage of ingot metal is the cause of the plant's failure to begin operations. The recent action of the northwest power authorities in establishing a 2-hr period when power may be interrupted could further aggravate the situation.

► Top automobile stylists Helene Roth and George W. Walker gave this picture of the car of tomorrow to Detroiters recently: more gadgets including things like heaters for baby bottles and canned soup; umbrella holders and safety belts; more exciting color contrasts and less chrome. Walker believes that modern cars have reached just about the maximum length and width and have about as much interior room as can be expected. He doesn't expect the present basic designs to be changed importantly for at least several years.

► Stainless steel producers are working to bring down production costs by means of more efficient rolling and handling facilities. Many producers have installed reversing mills for the continuous rolling of wide strip for use as sheet. One producer is installing a Steckel mill for continuous hot rolling of wide strip to gage which eliminates the cost of intermediate anneals in conventional cold rolling.

► Some steel people are well aware of the fact that the gap between them and the public is wider than ever. Some hard thought is going into "what to do?" It may be quite a while before anyone in the industry finds an answer to that question—if it is ever found. But effort will be made to find out why this situation has existed. Then something drastic may be done.

► Offerings of ingots to steel hungry car manufacturers are increasing. Some ingots are being offered at prices as high as $116. In this case the finished steel would hit $265 per ton. Steel ingots produced by foundries are an important factor in the present market, according to informed sources.

► What bothers a lot of industrialists is that apparently they can get all the steel they want if they are willing to pay fancy gray market prices. A fact often overlooked is that one can buy all the cars he wants, too — if he pays through the nose.

► Engineers of one of the large aircraft manufacturing plants point out that almost 10 pct of the airframe weight of the Flying Wing bomber is rubber.

► Swedish charcoal pig iron is hitting United States ports. So far over 1054 tons have been shipped here. Of this amount, 700 tons came over in July alone.

TYPICAL aluminum bronze applications, including various machine tool parts, a bevel gear, a plug valve and a pickling basket fabricated from extruded aluminum bronze rods and welded.

ALUMINUM BRONZE ALLOYS—

Metallurgical characteristics of the aluminum bronze alloys are such as to present opportunities for a variety of industrial applications. Considerable flexibility can be realized insofar as antifriction qualities, thermal conductivity, wear, impact, fatigue and corrosion resistance are concerned, making possible a wide selection of desired properties. Of interest also is the adaptability of aluminum bronzes for service at from 1000° to —295° F.

METALS have named the milestones in history, with the era of bronzes the first of them all; however, through the centuries of progress in developing and using metals, the bronze pioneer clan has often faltered, and for the most part, failed to keep pace with the other prominent alloys of lesser heritage. Stagnated outdated compositions, obscure inadequate properties, confusing and overlapping specifications and vague qualifications, have crippled respect for man's oldest alloy.

Lately there has arisen a family of bronze alloys which may help regain the prestige of copper-base alloys for modern production uses. Composed of copper, aluminum and iron, the alloys present no handicap to procurement, and hence do not depend on international relations or conditions, nor are they liable to extreme price fluctuations which sometimes characterize imported alloying agents. Furthermore, variation of only three common ingredients and close production control make available a complete series of alloys ranging from soft grades suitable for bearings, gears and other uses common for bronzes to a very hard alloy qualifying for some services normally reserved for ferrous metals.

For instance, table I shows a basic series of high iron aluminum bronzes where grade 12 has a hardness of a little over 100 Bhn, while grade 22 reaches 331 Bhn with only an addition of approximately 5 pct Al and 2 pct Fe. This particular list of cast alloys, comprised of six compositions, plus four heat-treated versions, in

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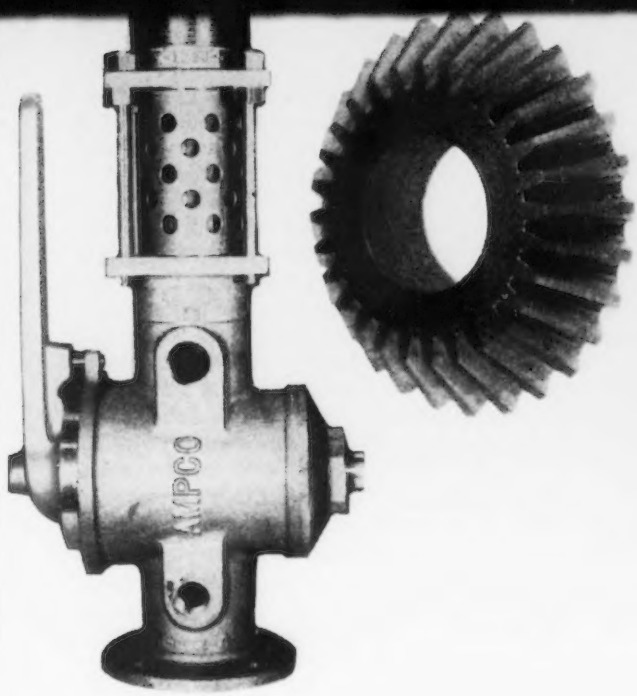

Their Properties and Applications

By JOHN C. KEMP
Development Engineer,
Ampco Metals, Inc.,
Milwaukee

itself presents opportunities for a choice of high physical properties for many services. Still other somewhat similar analyses have been developed to offer an even wider selection of properties. Characteristics such as anti-friction qualities, thermal conductivity, wear, impact, fatigue or corrosion resistance can also be more highly developed within this family of alloys by composition variations, by heat treatments or through the different forms of castings or wrought materials available.

Outstanding among the qualifications of aluminum bronze is its unusual ability to withstand wear, due primarily to the presence of an inter-

TABLE I

A series of high iron aluminum bronzes for castings showing typical range of physical properties available. Hyphenated grade numbers indicate heat treated versions.

Grade	Chemical Composition*		Ult. T. S., Psi	Y. S. (0.10 in. offset), Psi	P. L., Psi	El., (in 2 in.), Pct	R. A., Pct	Hardness		Modulus Elasticity, Psi (000 omitted)	Density, Lb per cu in.	Electrical Conduct., Pct	Thermal Conduct., CGS	Elastic Limit Compr., Psi	Ultimate Compr., Psi	Charpy, Ft-lb	Fatigue Strength, Psi
	Al,	Fe, Pct						Bhn 3000 kg)	Rockwell								
12	8.5 - 9.3	2.50-3.25	80,000	30,000	14,000	40.0	40.0	131	74B	16,100	0.2791	12.8	0.20	18,000	119,200	25	25,000
16	9.60-10.30	3.0-4.0	90,000	32,000	16,000	22.0	22.0	146	80B	15,385	0.2752	12.9	0.19	22,000	124,600	10	29,000
18	10.30-11.0	3.0-4.25	90,000	37,000	18,500	14.0	12.0	174	88B	14,350	0.2738	12.76	0.18	38,000	136,430	10	32,000
18-13	10.30-11.0	3.0-4.25	90,000	33,000	15,000	18.0	16.0	156	83B	14,350	0.2742	12.7	0.18	28,000	140,000	15	30,000
18-22	10.30-11.20	3.0-4.25	100,000	53,000	34,000	6.0	6.0	223	97B	15,450	0.2745	12	0.18	50,000	155,000	6	36,000
18-23	10.30-11.00	3.0-4.25	100,000	45,000	31,000	14.0	14.0	187	91B	15,450	0.2745	12.6	0.18	45,000	150,000	10	34,000
20	11.30-12.20	3.25-4.50	85,000	40,000	19,500	4.0	3.5	207	95B	12,000	0.2683	10.7	0.17	45,000	146,000	4	.....
20-13	11.30-12.20	3.25-4.50	85,000	35,000	18,000	6.0	5.0	202	94B	12,000	0.2689	10.7	0.17	42,000	145,000	6	.....
21	12.60-13.40	3.5-5.0	75,000	55,000	.....	1.5	.....	285	29C	13,200	0.2580	10.2	0.16	50,000	160,000	2	.....
22	13.6-14.4	4.0-5.25	85,000	70,000	.....	0.5	0.0	331	35C	13,960	0.2571	9.9	0.16	65,000	171,000	2	.....

* Copper is base metal. Constituents other than aluminum and iron total 0.50 max.

metallic compound developed to an effective extent within certain of these alloys. Fig. 1 shows the extent of this phase as cloverleaf-like particles of the intermetallic compound uniformly dispersed across the section. These minute particles are extremely hard and act as tiny pedestals in the softer, but tough aluminum bronze matrix, reinforcing the entire composition and retarding wear.

Recent tests of one of these alloys in rolled sheet form for the gib liners in large boring bars, for example, showed that not only did power consumption at 60 ipm feed drop to ⅝ hp, from the 2¾ hp required for moving the column when conventional cast iron ways were used, but many times the life was realized. Proper lubrication was provided, but conditions being equal, it was also found that the aluminum bronze ways permitted speeds without chatter as low as ½ ipm while the cast iron was not steady enough for precision work under 2 ipm.

In innumerable cases this intermetallic compound, combined with the proper grade of aluminum bronze, has accounted for the difference in obtaining longer service life for bushings, bearings, gears and even drawing and forming dies. In this latter example, the hardness of recommended alloys range from 300 to approximately 400 Bhn which, of course, does not even approximate that of normal hardened die steels. The principle is that this hard aluminum bronze with its precisely developed structure permits the sliding action of a dissimilar metal over its surface with less friction and wear.

These characteristics are critically important when forming and drawing stainless steel. Aluminum bronze dies are also extensively used for drawing sheet stock of pickled carbon steel, zinc, silver, lead, Inconel and Monel metal. This application also includes the forming, bending and reduction of tubes in the above metals.

A large producer of stainless steel containers found that by using an aluminum bronze die he could obtain 77,000 pieces of a heavy gage stainless cup part before redressing, whereas 3500 pieces was the average life from the conventional steel die. A majority of stainless steel cooking utensil manufacturers report substantial reductions in finishing costs when aluminum bronze dies are used. Automotive hub caps, headlights and other accessories and trim call for the use of this die material, as well as home appliance parts dairy containers, window frames, sinks and switchboxes. In general, they will excel where surfaces must be free from scratches, and where seizure and/or galling would cause inadequate die life. Aluminum bronze dies and/or die inserts, like steel dies, will not give good service if used for drawing scaly or unpickled stock.

Of interest also is the adaptability of aluminum bronzes for abnormal temperature services, both cold and moderately high. The physical properties of most ferrous materials are seriously affected in the lower temperature ranges, becoming quite brittle even at 0°F, and many nonferrous alloys suffer serious losses with a rise of several hundred degrees above room temperature. Aluminum bronzes, however, seem to adapt themselves to a wider range, as shown in fig. 2.

Subzero temperatures as low as −295°F, actually cause an improvement in physical properties

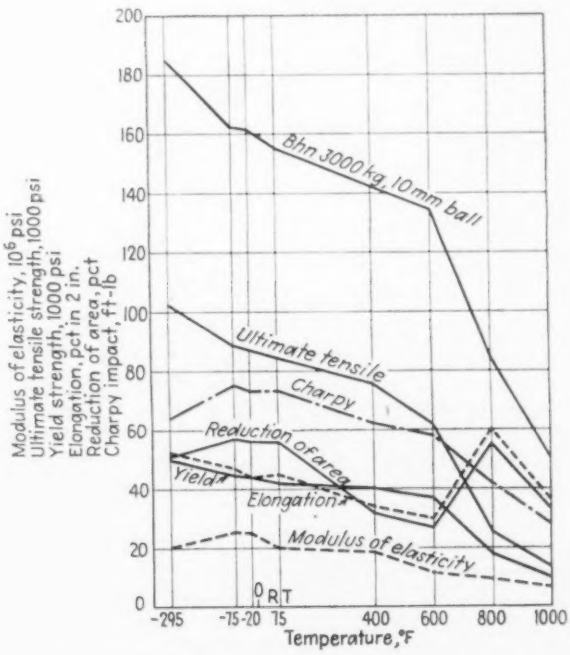

FIG. 2—Physical properties of annealed aluminum bronze rolled sheet (Ampco grade 8) at various temperatures. Data taken from Battelle Memorial Institute report No. S-1003, dated May 20, 1946.

except for a drop in impact and reduction of area; hence these alloys are acceptable for low temperature service such as the handling of liquid oxygen, or high altitude applications.

The range above normal is just as interesting, and perhaps more usable, particularly in view of current developments in condensers and heat exchangers operating in high temperatures. Some

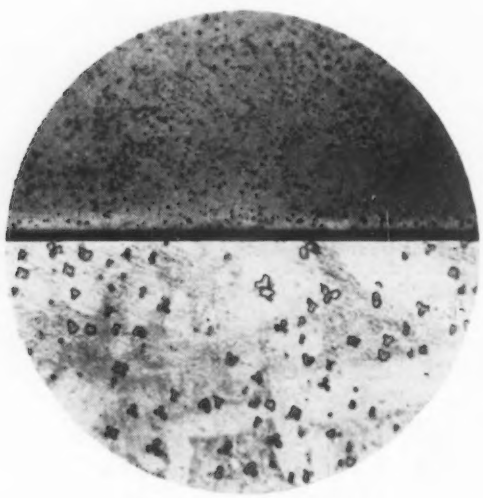

FIG 1—Microstructure of high iron aluminum bronze (upper half 100X, lower half 1000X), showing extent and distribution of intermetallic compound which appears as clover leaf-like particles dispersed uniformly throughout the section.

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reduction of properties results from an increase in temperature, but up to 600°F all ratings, particularly yield strength, maintain a much higher level than for customary condenser tube alloys. Even to temperatures of 800° to 1000°F a comparatively high proportion is retained.

Of equal importance for this type of service is the surprising effect of heat upon the thermal conductivity of aluminum bronzes as shown in fig. 3. Like other copper-base alloys, a fairly high rating for heat transfer is found at normal temperatures. Increases to the higher ranges of 600°, 900° and 1200°F, however, show a remarkably proportional improvement so that at 1200°F it is almost double that at 80°F.

To these advantages of high strength and thermal conductivity at elevated temperatures must also be added another even more significant ad-

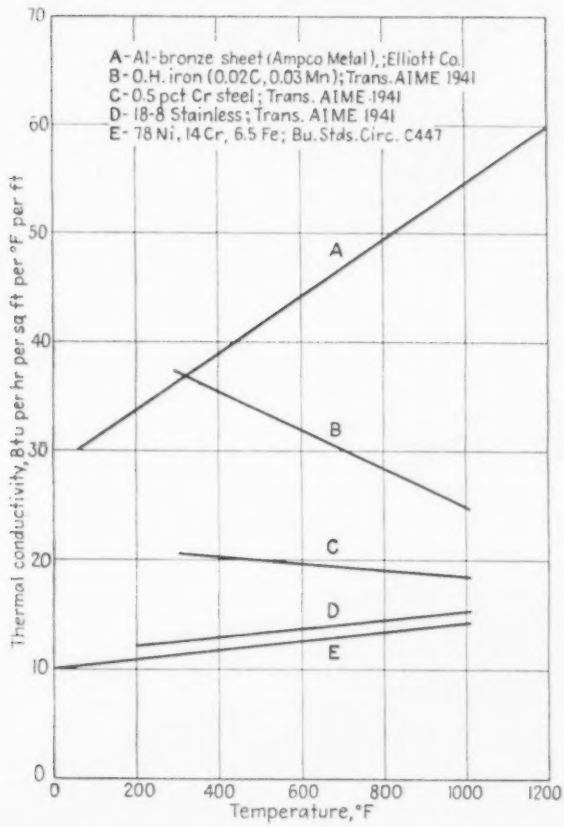

FIG. 3—Thermal conductivity of various alloys normally used for heat exchanger tubes.

vantage—resistance to corrosion and scaling. Because of the many contingencies and variables that must be accounted for in any corrosive medium, it is difficult to definitely classify any metal for its exact resistance. Experience with these alloys, however, has qualified them for many severe and troublesome acid and caustic conditions. Excellent records have been compiled in pickling services. Frequent applications for these properties as well as the wear resistance is found in canning machinery, brewery equipment, many cellulose products processors and oil well and refining installations. Marine equipment or other

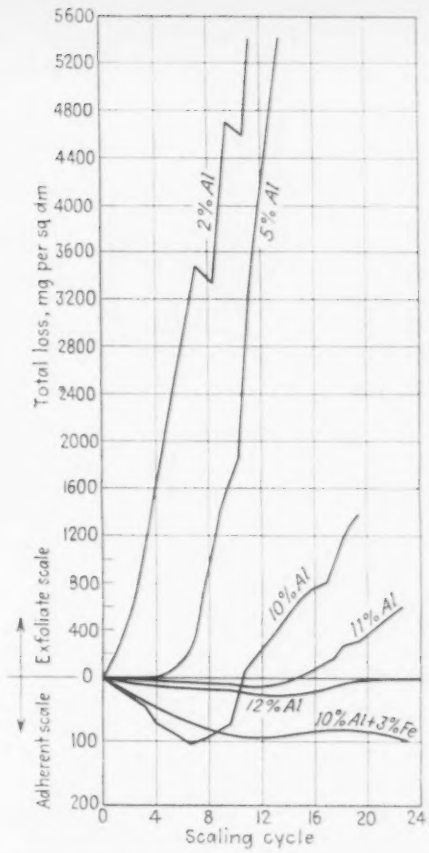

FIG. 4—Scaling of aluminum bronze alloys in atmosphere of dry air containing 5 pct SO_2. The ultimate scaling rates of the 2 and 5 pct Al alloys were established after 15 and 22 cycles, respectively.

requirements subject to sea water or brine attack have found aluminum bronzes highly satisfactory.

The nonscaling qualities of these alloys can be more definitely qualified by reference to report RRA-527 of the British Nonferrous Metals Research Assn. wherein results are given on the tests of 18 materials for resistance to oxidation and scaling at 400°C (752°F). The materials investigated were three high conductivity coppers, two arsenical coppers, six aluminum bronzes (ranging from 2 to 12 pct Al—which proved to form a group of alloys of high scaling resistance), a group of alloys containing small amounts of common elements added individually to copper, and several other copper base alloys used industrially at elevated temperatures such as silicon, nickel and tin bronzes.

These materials were subjected to the following atmospheres at 400°C (752°F) to determine their adherent or exfoliate scaling qualities:

(1) Dry air, free from acid impurities; and (2) the same air stream plus the following additions by volume; 10 pct H_2O vapor, approximately 0.1 pct SO_2, 5 pct of SO_2, and moist hydrochloric acid (approx 0.1 pct HCL and 1 pct H_2O).

The values obtained with dry air were to afford a basis for comparison with the other atmospheres which were intended to accelerate the attack or to simulate possible service conditions. The amount of exfoliate scale removed in each

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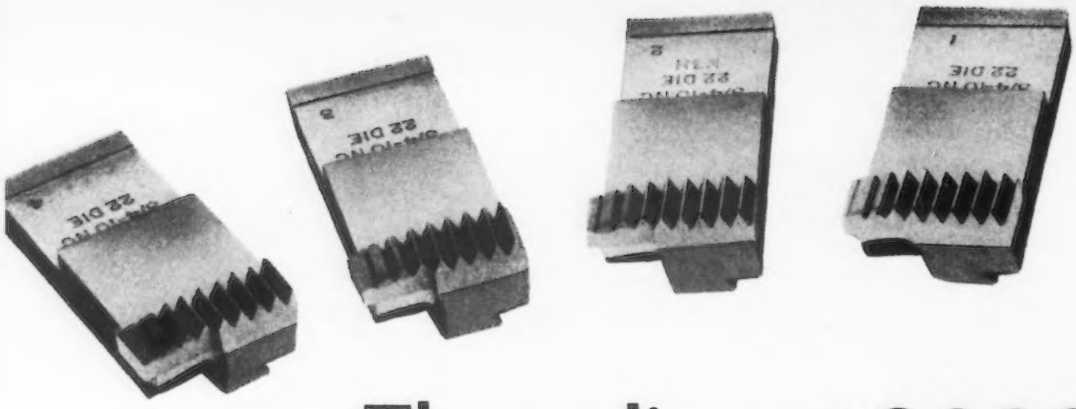


CARBIDE tipped thread chasers that permit threading operations at normal turning, facing and chamfering machine speeds.

Threading at 2000 RPM

THREADING is one machining operation that has necessitated a reduction in machine speed causing part production to be slowed up unless additional capacity is provided. With the advent of carbide tipped thread chasers with ground thread form, recently announced by Jones & Lamson Machine Co., Springfield, Vt., new standards for high speed, high production threading are possible.

With a typical setup such as shown in fig. 1, tooled on a No. 3 (1½x10 in.) ram-type turret lathe, the stud shown is machined at a constant

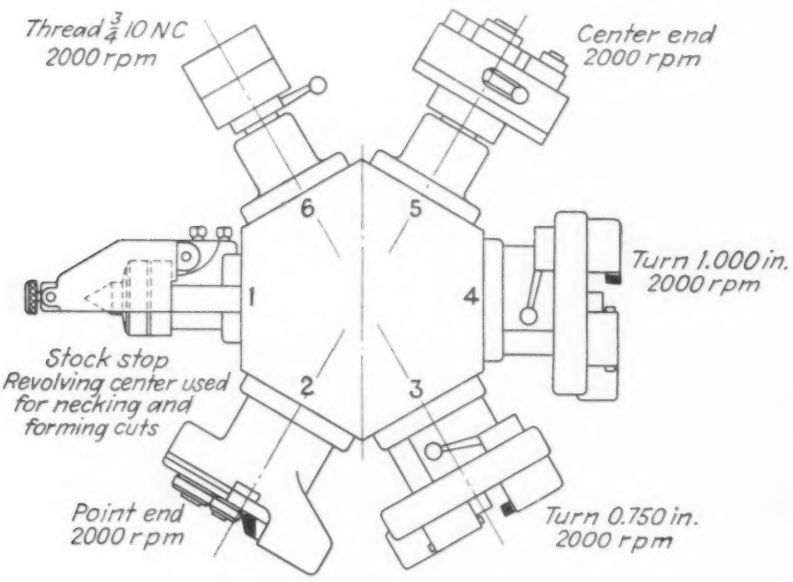
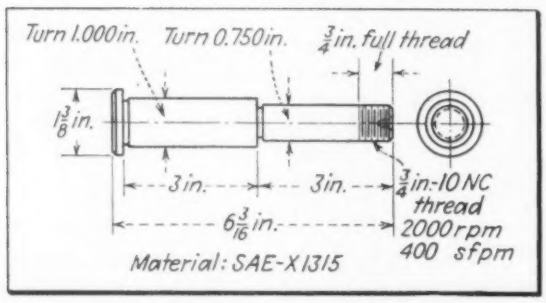


FIG. 1—This turret tooling is used on a J&L No. 3 ram type turret lathe for turning and threading the steel stud shown in the insert. Threading with carbide tipped chasers, is done at a spindle speed of 2000 rpm and at a machining speed of 400 sfpm.



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By S. T. HICKS
Jones & Lamson Machine Co., Springfield, Vt.

With Carbide Tipped Chasers

Through the use of carbide tipped thread chasers, threading of SAE X1315 steel studs as described in this article, can be accomplished at machine spindle speeds of 2000 rpm and cutting speeds of 400 sfpm, eliminating the necessity of reducing machine speeds for threading operations.

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machine spindle speed of 2000 rpm. Heretofore, jobs such as this SAE X1315 stud would have to be handled with carbide tooling at all positions except threading and possibly cutoff. The threads would be cut at 25 to 30 sfpm with high speed steel chasers. On this stud, the thread is cut at a speed of 400 sfpm, about a 15 to 1 step up in surface feet over the previous rate, and the spindle speed remains constant throughout the sequence of the cuts.

The complete machining cycle time is 1 min, while the actual threading time is about 1/3 sec at 400 sfpm. A high quality finish with a Class III tolerance is obtained. The machining sequence is shown in table I.

The job is not a stunt demonstration. It is a standard part, a typical run-of-the-mill bar machine operation, and, with the exception of the threading operation, is routine in every respect. The die head, see fig. 2, is a standard stock model tangent die, with no special structural features. The die, model 22S-23S, has a range of 5/8 to 1½ in. work diam and it operates on the tangent or end-cut principal using a set of four chasers; the carbide tipped chasers are special. The die head opens automatically and withdraws the chasers at the end of the cut.

The importance of this new development is apparent when it is considered in terms of production threading machinery as well as carbide tooled automatic and turret type lathes. The new threading speeds make possible a balanced spindle speed for the full sequence of operations.

Investigation of the possibilities of carbide type chasers has been carried on intensively since 1942 at Jones & Lamson. Special purpose grinding machines, developed and built by J&L for the manufacture of the standard high speed steel chasers, are used to produce a highly accurate ground-in helix angle and thread form in the solid carbide tips. For the present, production is limited to standard 60° thread forms.

After satisfactory preliminary results were obtained at the factory, field test installations were

TABLE I

Machining Cycle on Stud Job

1⅜ in. Bar Stock — Hold in Collet Jaws — Machine in Sequence Below

Hexagon Turret Position	Cross Slide Position	Operation	Machine Data: Speed, Fpm	Spindle Rpm	Feed per Revolution, in.	Length of Cut, in.
1		Stock Stop				
2		Point End	720	2000	Hand Feed	3/8
3		Turn 0.750 in. diam.	720	2000	0.015	2 15/16
4		Turn 1.000 in. diam.	720	2000	0.022	3
5		Center Drill End		2000	Hand Feed	
6		Thread ¾—10 NC	400	2080	Hand Feed	5/8
	Rear	Neck (2) & Form (Revolving Center)	720	2000	Hand Feed	3/16
	Front	Cut Off	720	2000	0.011	5/8

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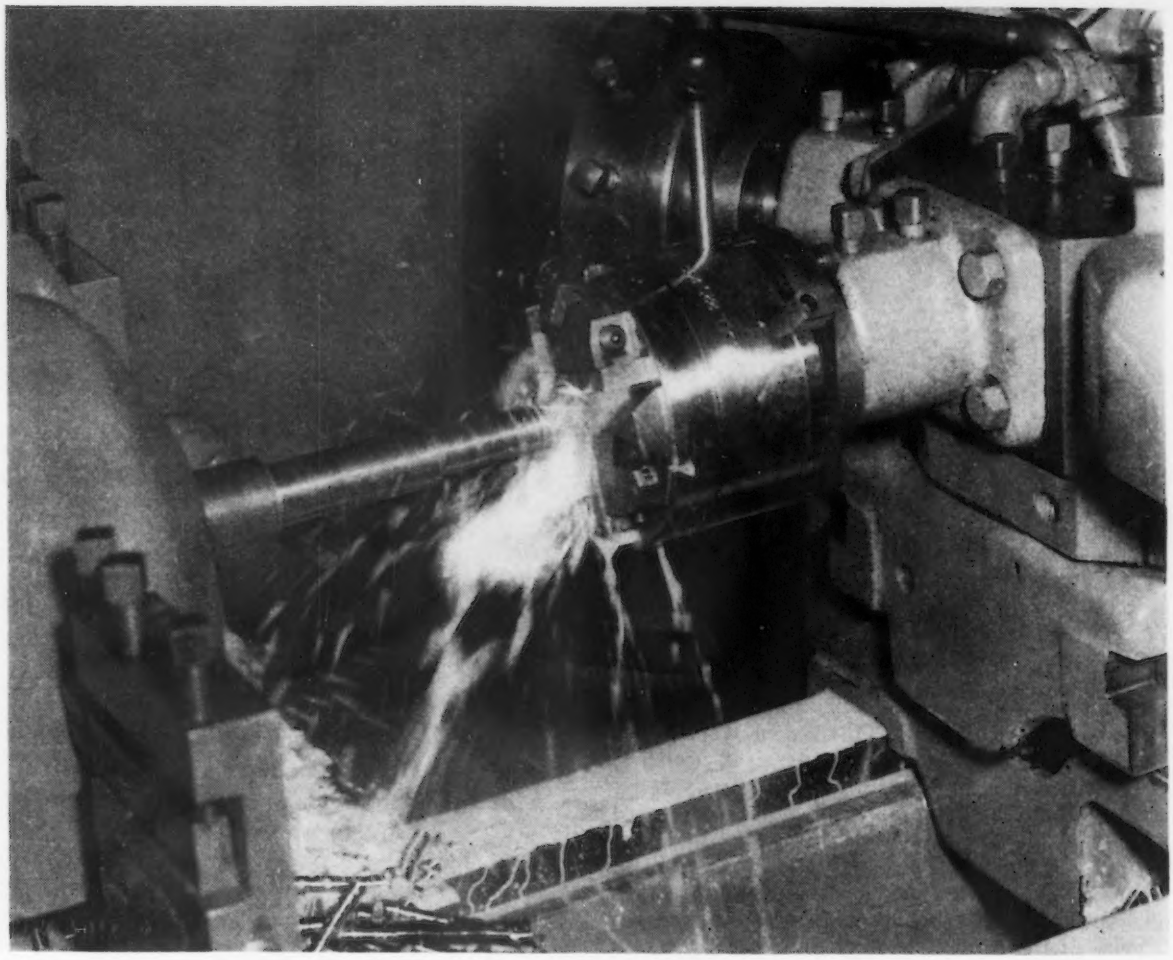

FIG. 2—Standard, stock model tangent die heads are used, with no special structural features, in using carbide tipped chasers.

set up on screw machines and automatics in a large manufacturing plant. Results to date are encouraging on steel applications and especially on such abrasive materials as hard rubber, fiber, etc., which have a rapid dulling effect on ordinary chasers. Some recent illustrations of the use of these chasers include threading of fiber tubing, copper, and cold-rolled steel. A ¾-16 NF thread, 1¾ in. long, was required on each end of fiber tubing. Using high speed steel chasers at 270 rpm, production was 100 pieces per sharpening, and down time and tool expense high. With carbide tipped chasers at 1420 rpm (210 sfpm), production was approximately 10,000 pieces per sharpening with considerable savings in tools and down time. A ⅜-16 NC thread on copper bar stock was machined, the thread length being 1¾ in. at each end of the bar. Using high speed steel chasers at 270 rpm, production was 500 pieces per grind. With carbide tipped chasers at 1620 rpm (160 sfpm) production was approximately 3000 pieces per sharpening.

On cold-rolled steel, a ½-13 NC thread 2 in. long was required. High speed steel chasers were operated at 300 rpm (39 sfpm). Carbide tipped chasers permitted an increased speed of 1600 rpm (210 sfpm).

Carbide chasers are not to be considered the solution to every threading problem. They must be suitably applied and correctly handled. Their full effectiveness is only possible on machines incorporating sufficient speeds, power and rigidity to handle carbide tooling efficiently. Because of these factors and others such as machinability, adequate clearance near shoulders, etc., it is necessary to analyze each proposed application in order to screen out the relatively high number of jobs with unsuitable conditions.

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Properties of Nodular Cast Iron

—*a Bibliography*

DEVELOPMENT of a method for producing nodular graphite iron without the necessity of heat treatment, as in the malleable cast iron process, has stirred considerable foundry interest both in this country and abroad, where the technique was developed under the sponsorship of the British Cast Iron Research Assn.

These irons, commonly referred to as nodular irons or nodulite, are unalloyed in the general sense, yet are reported to have physical properties substantially above the normal unalloyed gray iron.

A survey of the literature, assembled in the July, 1948, Bulletin of BCIRA, reports the following references:

(1) Graphite formation in cast irons and in nickel-carbon and cobalt-carbon alloys was reported by Morrogh and Williams in the British publication, Journal of the Iron & Steel Institute, v. 158, March, 1947.

(2) The fundamental work leading to the discovery of methods for achieving nodular structures in the as-cast state is described in the paper "Graphite Formation in Grey Cast Iron," Morrogh and Williams, Institute of British Foundrymen, Annual Meeting, June, 1947, Paper 875. The paper (a) reviews existing theories on graphite formation processes, (b) discusses those features of graphite formation in cast irons which still require explanation, and (c) describes the possibility of obtaining nodular structures in the as-cast metal.

(3) Pearce gives an explanation in "The Formation of Graphite in Cast Iron," J. of Research & Development, BCIRA, v. 2, February, 1948, of the process of decomposition of solid cementite on the basis of observed phenomena. The breakdown of cementite by annealing is studied, the influence of sulfur and its effect on nodular structure is examined, and the theories suggested to explain the growth of the graphite nodules are discussed. The influence of cooling, the relationship between nodule number and rate of graphitization, and other factors are also studied.

(4) "Nodular Cast Irons," by Morrogh, J. of Research & Development, BCIRA, v. 2, February, 1948, gives a detailed account of the work carried out to produce as-cast nodular structures in cast iron. The element selected as a desulfurizing agent to produce such structure was cerium. Addition proportions of this element and the appropriate molten cast iron compositions are discussed, and notes on the effect of constituents and special alloying elements are included. Improvement in structure and mechanical properties by addition of a graphitizing inoculant subsequent to the cerium addition is reported.

(5) Influence of sulfur in the process is thoroughly discussed in "Production of Nodular Graphite Structures in Cast Iron," Morrogh and Williams, J. of the Iron & Steel Institute, v. 158, March, 1948, and the general composition requirements for successful treatment are given. Mechanism of solidification is described, and hypereutectic graphite is shown to form in the liquid with a spherulitic structure. The mechanical properties obtainable are discussed.

(6) Pearce gives a brief account of the method for producing nodular structures and describes the mechanical properties to be expected from the material in "A New Cast Iron: The Nodular Graphite Structure," a paper read at a meeting of the Chemical Engineering Group, Society of Chemical Industry, April 6, 1948.

(7) The influence of graphite in cast iron and the improvements in mechanical strength to be obtained when the graphite is in nodular form are briefly discussed in "Recent Technical Developments in the Production of Iron Castings," Dickinson, Foundry Trade Journal, v. 84, April, 1948.

(8) Morrogh describes the development and means of producing nodular cast iron and discusses the inoculation or double-treatment technique in "Nodular Graphite Structures Produced in Gray Cast Iron," American Foundrymen's Assn., Annual Meeting, May, 1948, Preprint 48-46.

(9) Further data on mechanical properties of nodulite, based on test bars in which the material was treated with cerium only as well as with both cerium and a graphitizing inoculant (SMZ alloy), are given in "Nodular Cast Irons, Their Production and Properties," by Morrogh and Grant, Institute of British Foundrymen, Annual Meeting, June, 1948, Paper 889. This paper concludes that nodular irons are particularly suitable for applications demanding high strength and shock resistance together with good machinability. By heat treatment or the use of special alloying elements, mechanical properties of the material are said to be raised to a very high level.

Electroplating Alloys From

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TWO or more metals may be deposited from an electroplating bath only under special conditions. If two soluble metal salts of different metals are taken at random, it is unlikely that the metal ions will codeposit on application of electric current across the electrolyte. Experimentally it is true that an alloy deposit would eventually be obtained by trying enough combinations of metal salts; but the deposit would be of commercial value only if it were sound and if the plating conditions were practicable from the standpoints of control and reproduction.

The most successful alloy plating baths have been those that are similar to single metal baths, with the addition of a second soluble metal. This is largely true because the single metals are deposited commercially with limited electrolyte conditions.

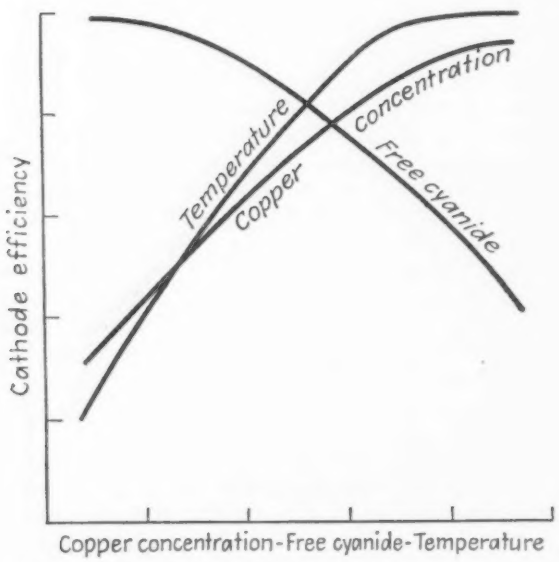

FIG. 1—Effects of variables in a copper cyanide bath. If operated at high pH and temperature and at low free cyanide concentration, cathode efficiency will be 100 pct.

Due to limiting bath conditions for both single metal and alloy deposits, the cyanide baths have proved applicable to a wide range of alloy compositions. Copper, silver, zinc, cadmium and gold are commonly plated from cyanide baths. The alkaline tin bath, which is similar in many ways to a cyanide bath, is also popular, and from these metals many alloy combinations have been produced.

A prime requirement of an alloy bath is that the metals have a similar tendency to plate; that is, nearly equal deposition potentials should exist during codeposition. This effect is seen in acid baths where copper has a strong tendency to plate compared with zinc. If a small amount of copper is added to an acid zinc bath, the copper will deposit as fast as it reaches the cathode. Codeposition will be limited by the rate of diffusion of copper ions across the cathode film. In fact, copper will deposit chemically on the zinc anode even though the current is anodically dissolving zinc at the time, and when a large amount of copper is present in the acid zinc bath, copper will deposit exclusively.

A noble metal, one that has a greater tendency to plate in competition with a second metal in an alloy bath, will increase in the deposit with decrease in current density, increase in agitation or increase in temperature. These are the changes in conditions that favor contact of the noble metal ions with the cathode by diffusion across the cathode film. If the deposition potential of each of two metal salts is the same for relatively high concentrations of each of the salts, the composition of the deposit will not be greatly affected by small changes in plating conditions. Nickel-cobalt alloys deposited from acid baths are a good example.

Cyanide Baths

By J. B. MOHLER
New Castle, Pa.

In the continual search for more durable, more attractive and higher quality commercial surfaces, considerable effort has been devoted to the development of processes for electroplating alloys. In such work cyanide baths have proved especially well suited to a wide range of alloy depositions. This article reviews the theory and practice of plating brass, bronze and other alloys from the cyanide and alkaline-cyanide baths.

In cyanide and alkaline baths, metal complexes are formed to reduce the quantities of metal ions to very small concentrations. As a result, the deposition potentials are greatly changed in comparison with acid baths. Where copper will have a deposition potential of about +0.3 v in an acid bath, it will have a deposition potential of approximately −1.0 v in a cyandie bath. Zinc will have a deposition potential of the order of −0.6 v in an acid bath and −1.0 v in a cyanide bath. These voltages are approximate and can be considerably altered by a change in bath composition. However, where copper and zinc codeposit from an acid bath only under limited and sensitive

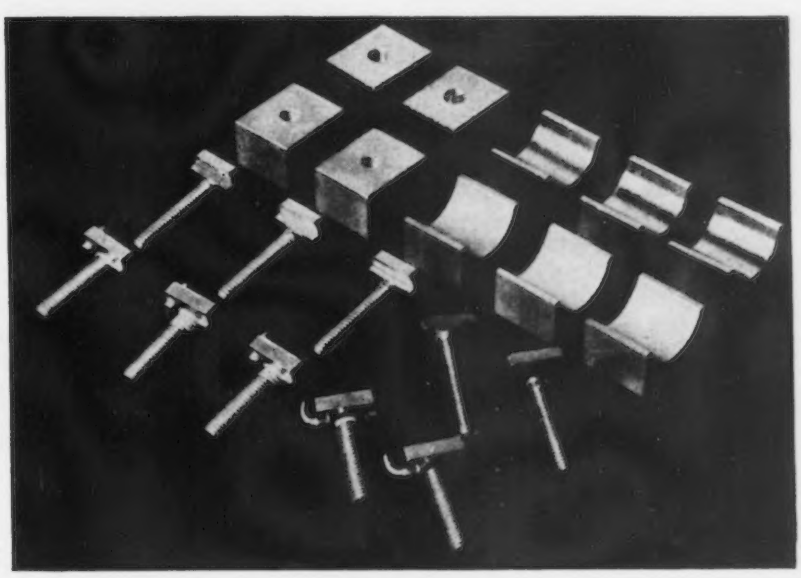

FIG. 2 — Electrical equipment parts, reflectors and plumbing fixtures are among the commercial applications of bright copper-tin-zinc deposits. The J-bend has been split to show the throwing power of the bath to interior regions. Illustrations courtesy of Hanson-Van Winkle-Munning Co.

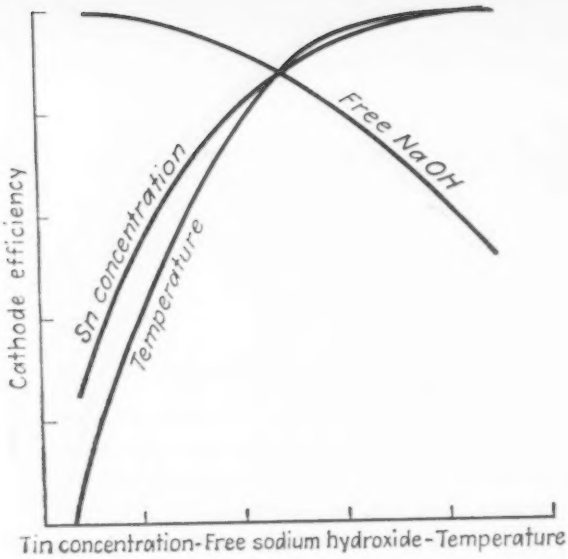

FIG. 3—Characteristics of the alkaline tin bath. Anodes must be maintained in a polarized state.

conditions, codeposition from a cyanide bath is possible under easily controlled conditions.

Any of the common cyanide baths can be operated under conditions such that hydrogen will be evolved during metal deposition. This means that hydrogen evolution, or cathode efficiency, can be used as a measure of the tendency of the metal to deposit, and that the metal is depositing at the deposition potential of hydrogen under alkaline conditions.

The tendency of copper to deposit from a cyanide bath can be followed by the addition of cyanide. As cyanide is added, the copper ion concentration is reduced and, if the free cyanide is sufficiently high, copper will not deposit. The tendency of the hydrogen to deposit will be little affected since additions of cyanide to an alkaline solution will not greatly alter the hydrogen ion concentration. On the other hand, if a copper cyanide bath is operated at high pH, high temperature and low free cyanide concentration, the cathode efficiency will be 100 pct, as shown in fig. 1.

A silver cyanide bath is not greatly affected by increase in free cyanide content. High free cyanide alters the quality of the deposit, but will not affect the cathode efficiency which can be lowered only by a great increase in current density or a decrease in concentration. And either of these effects is offset by increase in agitation.

The characteristics of the cyanide copper bath and the cyanide silver bath lead to the conclusion that a silver-copper alloy would be possible with low silver concentration and high free cyanide, but that bath control would be difficult.

Other combinations of the alkaline-cyanide baths have proved more practicable—particularly combinations of copper, tin and zinc—and are showing promise as alloy plating mediums because of the range of deposits that are possible. Copper, zinc, cadmium, silver, gold and indium are preferably plated from cyanide baths. Tin can be deposited from an alkaline bath and small amounts of lead can be codeposited under the same conditions. The major limitation on alloy combinations lies in the inherent compatibility of the metal combinations rather than in electrochemical restrictions. For instance, it has been shown that lead is of limited solubility when codeposited with copper,[1] and that a similar result is obtained when lead is codeposited with silver.[2] On the other hand, copper, tin and zinc can be deposited in almost any proportion, and combinations of these three metals offer possibilities for a great range of properties in hardness, color and corrosion resistance. Some commercial applications of these deposits are shown in fig. 2.

The future of alloy deposits depends on experimentation with a range of alloys to determine how the properties may be used to advantage as commercial surfaces. But, before considering the range of alloys that can be produced, it will be well to consider what alloy plating has shown thus far.

First, two metals tend to form solid solutions, intermetallic compounds, or to be mutually insoluble depending on the combination of metals rather than the method of preparation. If the atomic diameters are favorable to fit into the parent lattice, alloys will form. The degree of solubility may vary from thermal methods, since it is affected by stress and crystal size, but metals that are not soluble in the solid state will not alloy when plated. Deposition in alternate bands of the two metals may occur, however such deposits are usually weak and do not have alloy properties.

Plated alloys often have the characteristics of cold-worked cast alloys due to small crystal size. Thus, the solubility of the minor metal may be higher than in castings, but will be reduced to the same amount by full annealing.

The second important point is that the commercially successful alloy baths are modifications of the common plating baths. Metallurgy and electroplating are both important for the development of alloy baths as the metals involved must be metallurgically compatible and must be deposited from a bath that can be continuously controlled.

The Alloy Baths

Of the great range of alloys that can be produced, combinations of copper, tin and zinc from alkaline-cyanide baths have been commercially successful[4] and are worthy of special note. The familiar colors of bronze and brass can be produced by codepositing tin and zinc with copper. Very hard white deposits of speculum metal have been obtained by depositing copper-tin alloys containing 55 to 60 pct Cu.[3] Tin-zinc alloys have been deposited that are said to have the protective value of zinc as an overlay for steel, and to provide the corrosion resistance of tin.[5]

Further combinations of these metals will depend on the need for deposits to meet color requirements, abrasion resistance, corrosion resistance or various engineering applications. An example of one engineering application is the

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use of brass deposits as an intermediate layer in bonding rubber to steel.

Characteristics of Cyanide Baths

Alloy plating from the alkaline-cyanide baths should be consistent with the principles of operation for single metal baths. For instance, the copper plating rate from a cyanide bath will depend on the free cyanide content whether another metal is present or not, and by addition of cyanide, the copper plating rate can be reduced. The copper cyanide bath is affected by the following factors (fig. 1); (1) Increase in free cyanide decreases the copper plating rate and decreases anode polarization; (2) increase in temperature increases the copper plating rate and decreases anode polarization; (3) increases in free cyanide, pH and temperature increase bath decomposition.

These conditions cover the fundamental requirements. Secondary considerations involve the concentration of metal salt and the use of additives such as Rochelle salt.

The following factors are important for the operation of a cyanide zinc bath: (1) Increase in free cyanide will decrease the zinc plating rate; (2) increase in pH will increase anode polarization and decrease the zinc plating rate, and (3) increase in temperature will increase the zinc plating rate and lower anode polarization.

From the requirements for copper plating and for zinc plating, it can be seen that an increase in caustic can be used as a control factor in an alloy bath containing copper and zinc. The effects of free cyanide and temperature are not so easy to predict since each of the baths responds in a similar fashion to these variables. However, each responds to a different degree and the composition of the deposit will be affected by a change in any variable. Also, cathode efficiency will increase with increase in temperature.

The successful alloy bath will depend on a selection of conditions that will produce a satisfactory plating rate; that will not cause a large change in the relative plating rates of the metals for small changes in bath conditions; and that will enable bath control and continuous operation.

In the alkaline tin bath, the following characteristics, shown in fig. 3, determine the conditions for bath operation: (1) Increase in temperature increases the tin plating rate; (2) increase in caustic decreases the tin plating rate; (3) high temperature and low pH promote bath decomposition with the formation of insoluble tin compounds; (4) high temperature and high pH promote the decomposition of sodium hydroxide to form sodium carbonate, and (5) anodes must be maintained in a polarized state.

In plating tin with another metal, the principal control variable is temperature. At room temperature, tin will not deposit; however, cathode efficiency increases markedly with increase in temperature.

From the requirements for the component baths, it can be seen that limiting conditions are imposed on the alloy baths by each of the metals involved. In the case of a tin alloy, the bath must be heated; but at high temperatures, excessive amounts of caustic or cyanide cannot be used for control purposes since the chemicals will decompose. Also, a tin alloy bath to deposit high tin requires that either tin or high tin alloy anodes be maintained in a polarized condition.

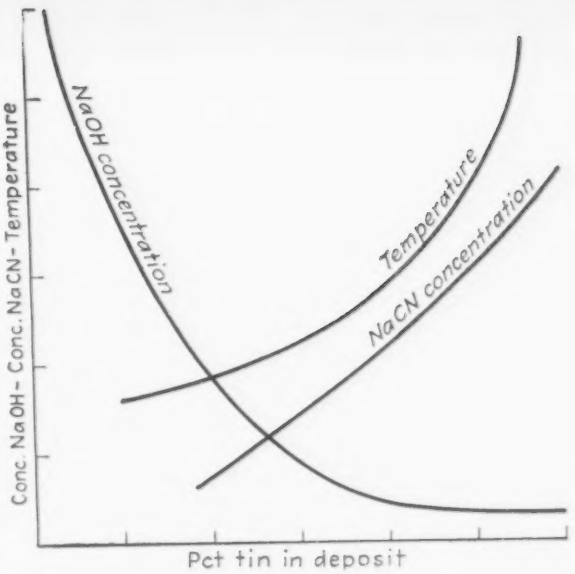

FIG. 4—Effects on alloy composition of the primary variables of a bronze bath.

The rate of silver plating from cyanide solutions is practically independent of cyanide concentration. Gold behaves similarly. The high efficiency copper cyanide baths are operated under conditions of high metal content, high temperature, low free cyanide and high pH to obtain a rapid plating rate, and if potassium salts are used in place of sodium salts, greater bath stability and higher cathode efficiencies are possible so long as the copper and tin contents are low.

The characteristics of the high efficiency copper bath warn that adhesion may not be obtained at high cathode efficiency. If the efficiency is to be 100 pct, activation of the steel by a cyanide strike bath may be required before plating.

Alloy baths require closer control than single metal baths since deposits must be held within a range by analysis or color as well as by quality. A knowledge of the effect of variables is essential to such control. Fig. 4 shows graphically the characteristics of a bronze bath. It is seen that the tin in the deposit increases with increase in temperature, with increase in sodium cyanide and with decrease in caustic. This is in keeping with the behavior of the component baths, but for actual definition of chemical limits it is helpful to determine such curves in the desired composition range for the deposit. In some baths, increase in current density may cause an increase in the tin plating rate and, in others, an increase in the copper plating rate, depending on the concentrations of cyanide and hydroxide and whether sodium or potassium salts are used.

The alloy baths are at times easier to control for quality since the presence of a second metal may act as an addition agent. The cobalt-nickel bath is a good example of this. Also, tin in the bronze bath has a similar effect since it is much

easier to obtain heavy bronze deposits than heavy copper deposits. When metal is deposited in small amounts, it is not essential to use alloy anodes since occasional addition of metal salts will not upset bath control.

Alloy anodes are generally desirable, but cannot always be used as immersion plating on the anodes may interfere with control. In such a case, separate circuits can be used to the anodes of each of the metals, or a regeneration system in a separate tank can be used to maintain metal concentration.

The literature on copper-zinc alloy plating is extensive. Interest was stimulated because of the wide applications for color plating and because of the suitability of the deposits in bonding rubber to steel. Also X-ray data has been conclusive in showing the deposits to exist in the same phases as alloys obtained by thermal methods. Processes have been reported for plating at relatively high current densities.[6]

A considerable amount of work has also been done on bronze plating and baths have been reported that will deposit high,[7] medium,[3] or low[8] percentages of copper. Fig. 4 shows the effects of the primary variables of a bronze bath on the alloy composition.

A tin-copper zinc alloy bath has been applied in production using alloy anodes to produce hard, blue-white, bright deposits.[4] The bath is operated with low total metal content at a cathode efficiency of about 35 pct. Since the metal content is low, the alloy anodes help control the composition of the plate by supplying metal in the proportion in which it is deposited.

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[6] Graham, 35th Annual Conference American Electroplaters' Soc. (1948).
[7] British Pat. 323,765 U. S. Pat. 1,970,549.
[8] U. S. Pat. 2,085,543.

Broaching Pinion Cage Slots

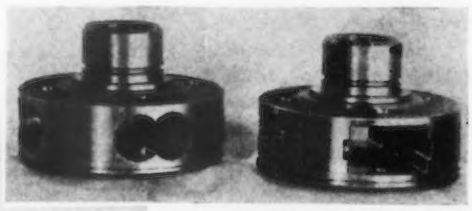
THE problem of how to rapidly machine a number of large slots in pinion cages, holding the faces of the slot to within 0.001 in. of parallel with the faces of the pinion cages, was solved by an interesting application of broaching developed by Colonial Broach Co., Detroit.

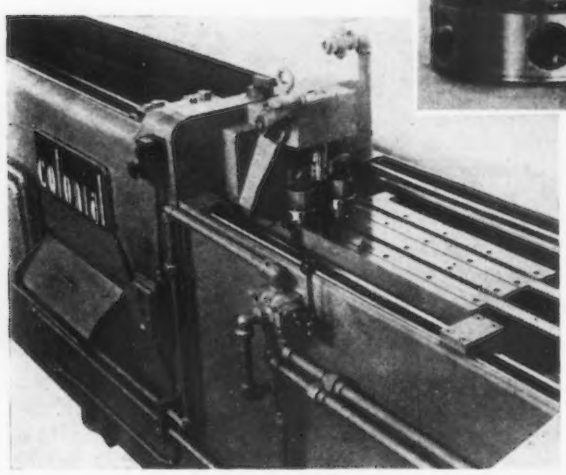
To broach the four required slots in the pinion cages, the slots are first rough bored as shown in fig. 1, left. The finishing operations are performed on two parts at a time in two strokes of the Colonial Universal Horizontal 15-ton broaching machine, using two broaches, as shown in fig. 2.

The two rectangularly shaped broaches on this machine are identical. They are guided on both sides of the work during the entire cut. The sequence of cutting operations by which different sections of the broach rough out and then finish each slot is shown in fig. 3. The recesses in the ends of the slot are used to guide the broach in its final cut of finishing the long faces of the slot. By cutting the opposite sides of the slot simultaneously, the cutting pressure is equalized.

The ability to hold to high accuracy while rapidly removing metal to finished size is the result of the manner in which the broach is guided. One broach on the machine cuts two opposite slots in the part. The part is then rotated 90° and the other two slots are cut by the second broach. Thus, a complete part is produced at every cycle of the machine.

Clamping is done hydraulically with the cylinder mounted above the fixture. The cylinder is not shown in the photograph.





ABOVE

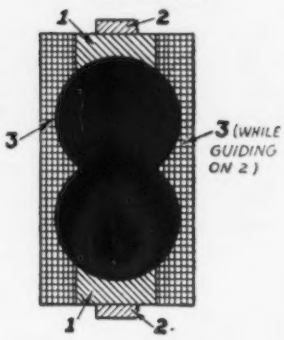
FIG. 1—First step in machining slots in the pinion cages is to rough bore them, as shown on the left. Then the large slots, shown at right, are cut to within 0.001 in. for parallel with the faces of the pinion cage in one operation.

LEFT

FIG. 2—Broaching the pinion cage slots is performed on this Colonial Universal horizontal 15-ton broaching machine.

BELOW

FIG. 3—Sketch shows sequence of material removal by which different sections of the broach rough out and finish the slot.



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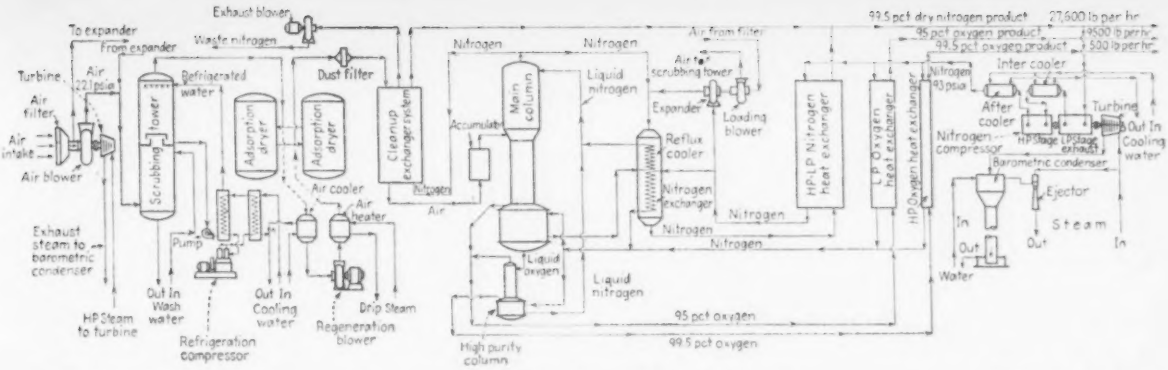

FIG. 1—Simplified flow diagram of oxygen plant. This unit was designed to produce 114 tons per day of 95 pct oxygen and 6 tons per day of 99.5 pct oxygen.

Oxygen Generating System Has Flexibility

OXYGEN producing systems for steelmaking, welding and other plant operations have been evolving rapidly. The latest entry in the field is a system, fig. 1, designed by the Elliott Co., Jeannette, Pa., which will produce oxygen of any purity, can simultaneously make both high and low purity product and does not need to be shut down periodically for deriming.

The cycle involves an atmospheric pressure, air distillation system combined with a nitrogen liquefaction and refrigeration system. Separate control over the making of the nitrogen reflux and the supply of refrigeration provides a wide latitude of operational flexibility and enables operation at reduced loads without loss in efficiency.

Recovery of oxygen from the air charged to the system is said to be over 97 pct. The exhaust nitrogen is over 99.5 pct pure and may be used for most chemical syntheses without further purification.

The flow diagram in fig. 1 shows a system designed for production of approximately 114 tons per day of 95 pct oxygen and 6 tons per day of high purity (99.5 pct) oxygen. The supplemental high purity product is made without increasing the horsepower per total unit of oxygen produced. In many instances, the user can obtain the full requirement of high purity oxygen at the same cost per ton as the low purity content. In addition, 332 tons of dry nitrogen are obtained.

Effectiveness of impurity removal is said by Elliott engineers to be better than in the standard Linde-Frankl plants since the air leaving the cleanup heat exchanger is at approximately 18 psia and —310°F in contrast to 90 psia and —270°F in a Linde-Frankl system. The vapor pressures of carbon dioxide and other impurities drop off rapidly in this range with the result that the 40°F difference in temperature and the considerably lower pressure accomplish the freezing out of impurities more efficiently.

Lower operating pressure also permits the use of low pressure equipment with considerable savings in unit cost. Simple butterfly valves, designed for operation slightly above atmospheric pressure and with a few pounds differential, can be used rather than more expensive switching valves designed for relatively high pressures and differentials of 60 psi or more.

Design is arranged so that through a combination of automatic valves on a fixed time cycle, one heat exchanger bank at a time is switched from service for purging of deposited impurities by a reverse direction flow of product dry nitrogen. Experimental operation of a pilot plant indicates that approximately 10 pct of the effluent nitrogen is required for this purpose. The gas is sucked through the exchanger being cleaned by an exhaust blower, and the alternating cycle permits continuous operation without shutdown.

Standardized sections for the heat exchangers, fig. 2, have been developed to permit mass production techniques for plants of any capacity. The heat exchangers are thin copper fins furnace bonded between brass plates and manifolded so that one fluid flows in one direction through every alternate passage and the other fluid flows in the opposite direction through the intermediate passages. This surface arrangement provides over 300 sq ft of effective surface per cu ft of heat exchanger volume.

An accumulator is provided in the air stream between the cleanup heat exchanger system and the main column to balance out the pressure and temperature fluctuations which occur when heat exchangers are switched. In the Elliott system, the differential pressure is only a few pounds gage, so the surge is very slight.

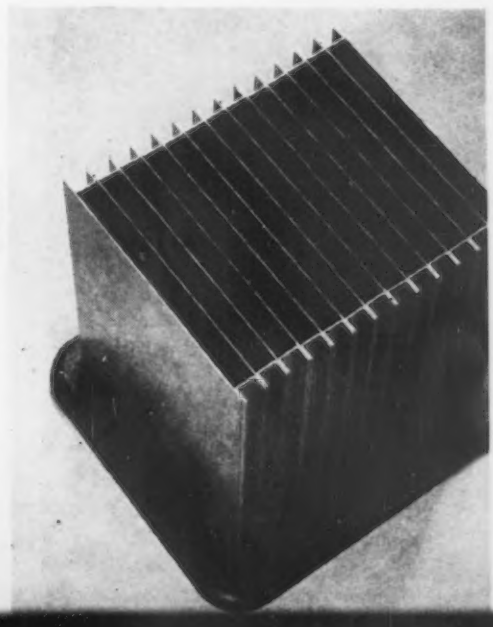

FIG. 2 — Section model of gas-to-gas heat exchanger.

FIG. 1—Successive stages of a Buick bumper guard show the blank at left to the completely drawn, formed, pierced, notched and trimmed piece at right.

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Stamping

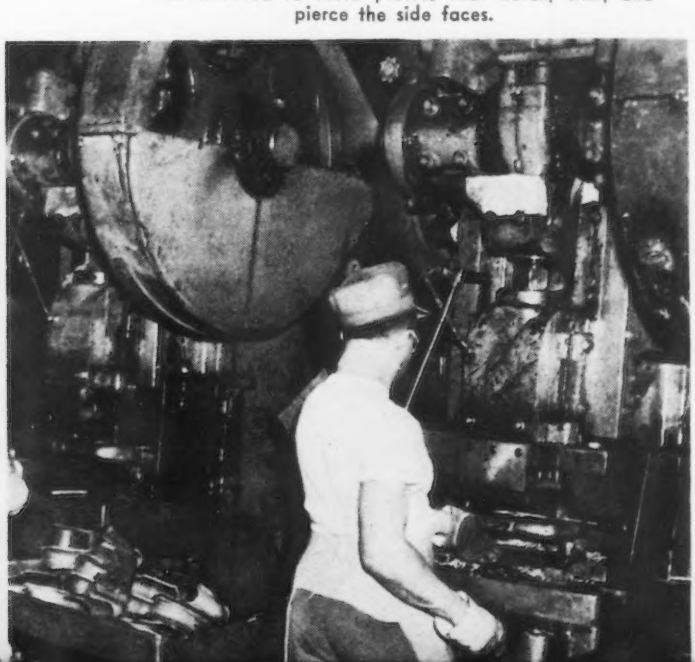
° ° °

By HERBERT CHASE
New York

° ° °

FIG. 2—A double-acting press draws the blanks which are coated with draw compound. In putting the blank in place, the piece previously drawn is pushed into a chute, down which it slides to the next press.

FIG. 3—After drawing and forming, guards are washed and directed to these presses that notch, trim, and pierce the side faces.



AUTOMOBILE bumper guards are produced at a rapid rate at Brown-Lipe-Chapin Div., General Motors Corp., Syracuse, N. Y. Typical of such parts is the Buick rear bumper guard shown in several stages of production in fig. 1.

Guards are blanked from cold-rolled deep drawing sheet stock 3/32 in. thick, preliminary to the first drawing operation. Blanks are dip-coated with No. 47 Chandler draw compound before they reach the double-acting drawing press shown in fig. 2. There, blanks are hand-fed with tongs.

The draw cycle required about 5 sec and as the drawn piece is ejected from the die, it is pushed into a chute by the next blank as the press operator puts the second blank into the die. Drawing forms the piece to the shape shown in fig. 1B, after which the piece is immediately redrawn in a second die which forms the ribs and paint recesses, as shown in fig. 1C.

This redrawing is done in a single-acting press and, as soon as the piece is ejected, the the press operator places it in a channel of a short washer through which it is pushed as new pieces are fed into this machine. A hot alkaline spray is applied in this washer to remove draw compound before further processing.

At the end of the washer, pieces pass to the next press, the first in a row of three of which two are shown in fig. 3. In the two presses shown, flash is sheared from side faces; notching

FIG. 4—A stud plate is arc welded to the inside of the bumper guards. Parts are loaded in the wheeled fixtures on a conveyer that carries them through two arcwelding booths at left. The man at extreme right unloads welded parts and inspects welds.

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Buick Bumper Guards

Four men operate five presses that draw, form and trim automobile bumper guards. Studs are then welded to the inside of the guard in a fast moving, wheeled fixture arrangement. The production line setup for this part is described in this article.

is done and holes are pierced, after which the pieces appear as shown in fig. 1D. Operators of these presses lay the pieces in the metal bins shown in fig. 3, convenient for the operator of the next press.

In the final press operations, flash is trimmed from the ends of the piece after which it has the shape shown in fig. 1E. As the operations in the last three presses are faster than the draw operations, two operators handle the work through three presses, shifting about as necessary to keep the work moving. Bins between presses have sufficient capacity to hold small tanks of parts that accumulate especially next to the press at which, for the moment, no operator is engaged.

Thus, with a total of two drawing and three supplementary presses, a crew of four men keep production moving at a rapid rate. At the end of this line, parts are placed in wire baskets on a chain conveyer that carries the parts through an automatic washer that cleans first in a soluble oil mixture and then in a K-7 Pennsalt solution maintained at boiling temperature.

Washing removes grease and other foreign matter and makes parts ready for the subsequent welding in of a fastening stud attached to a plate. Washed parts are loaded in tote boxes for delivery to the welding setup, a portion of which is shown in fig. 4.

To expedite welding, a conveyer is equipped with four-wheeled fixtures each having a U-shape hold-down device that is lifted against a spring and swung to one side as the parts are loaded and unloaded. Bumper guards to be welded fit the fixtures, and the stud, already staked to an oblong plate, is located by notches that fit suitable projections.

The two parts to be welded are loaded by one man who takes them from tote boxes spotted close at hand and sets the parts in correct relative position with the U-shaped clamp holding them in place. Wheeled fixtures move continuously along a track that carries them through two welding booths at each of which a welder makes two arc welds at two corners of the plate. A welder is located on either side of the conveyer and welds the two corners of the plate farthest from him, as these are in the most convenient position.

After the welds are completed, fixtures continue around the loop below the welding level, back to the unloading and reloading positions. During this transit, the welds cool and the assembly is ready for removal from the fixture. This unloading is done just as the fixture passes the end of the loop, shown at right in fig. 4 and is accomplished by an operator who also inspects the welds before he places the assembly in a tote box for removal to the finishing department.

Production

3646 SWITCH BOX — MONTHLY SALES

	1946	1947	1948	1949	1950	1951	1952
JAN		3000					
FEB		4000					
MAR		2000					
APR		7000					
MAY		5000					
JUN		6000					
JUL		2000					
AUG		4000					
SEP		6000					
OCT		3000					
NOV		2000					
DEC		4000					
TOTAL		48000					
4/MOS		16000					

TYPIST PLEASE NOTE—THIS SCALE CORRESPONDS TO TYPEWRITER (PICA) SCALE—SET PAPER GUIDES SO THAT CARD SCALE WILL REGISTER WITH MACHINE SCALE WHEN CARD IS TURNED INTO WRITING POSITION. START INDEX THREE (3) POINTS FROM LEFT EDGE OF CARD. USE OTHER POINTS OF SCALE FOR OTHER DIVISIONS OF VISIBLE TITLE. SET TABULATORS TO INSURE PERFECT ALIGNMENT OF EACH DIVISION OF INFORMATION. FOLD BACK OR REMOVE STUB AFTER TYPING. USE NEW TYPEWRITER RIBBON.

KARDEX VISIBLE DIVISION — REMINGTON RAND INC. — PRINTED IN U. S. A.

CAT. NO. 1-0152-D

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LEFT

FIG. 1—Record of Sales shows total orders by month. On these figures, estimates of future orders and production scheduling are based.

DATE	REF	CODE	QUANTITY RECEIVED	CUSTOMER ORDERS	OWE CUSTOMER	QUANTITY DELIVERED (shipped)	ACTUAL BALANCE
1/1/48 Inventory					0		5000
1/8				2000	2000		
1/15				4000	6000		
1/22				2000	8000		
1/23					5000	3000	2000
1/24			6000				8000
1/25					1000	4000	4000
1/28					5000*	6000	2000*
1/26				7000	2000		
1/27			8000				6000
1/30					0	2000	4000

* Indicates that the posting for Quantity Received is not up to date.

FINISHED STOCK INVENTORY

WHEN ORDERS ARE RECEIVED
1. Post to CUSTOMERS ORDERS.
2. Add to OWE CUSTOMER.

WHEN ORDERS ARE SHIPPED
1. Post to QUANTITY DELIVERED.
2. Subtract from ACTUAL BALANCE.
3. Subtract from OWE CUSTOMER.
(Show with * if a minus value)

WHEN PARTS ARE RECEIVED IN STOCK
1. Post to QUANTITY RECEIVED.
2. Add to ACTUAL BALANCE.

DATE	NUMBER	QUANTITY	DATE	NUMBER	QUANTITY	DATE	NUMBER	QUANTITY	DATE	NUMBER	QUANTITY
1			6	3/10 P1009	16,000	11			16		
2			7			12			17		
3			8			13			18		
4			9			14			19		
5			10			15			20		

CODE: C—CUSTOMER ORDER S—SPECIAL ORDER P—PRODUCTION ORDER — MIN. — MAX.

NUMBER 3646 — ARTICLE SWITCH BOX — MINIMUM 16,000 — ON ORDER — OUT OF STOCK

TYPIST PLEASE NOTE—THIS SCALE CORRESPONDS TO TYPEWRITER (PICA) SCALE—SET PAPER GUIDES SO THAT CARD SCALE WILL REGISTER WITH MACHINE SCALE WHEN CARD IS TURNED INTO WRITING POSITION. START INDEX THREE (3) POINTS FROM LEFT EDGE OF CARD. USE OTHER POINTS OF SCALE FOR OTHER DIVISIONS OF VISIBLE TITLE. SET TABULATORS TO INSURE PERFECT ALIGNMENT OF EACH DIVISION OF INFORMATION. FOLD BACK OR REMOVE STUB AFTER TYPING. USE NEW TYPEWRITER RIBBON.

KARDEX VISIBLE DIVISION — REMINGTON RAND INC.—11 — PRINTED IN U. S. A.

U. S. PAT. NO. 1817564

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RIGHT

FIG. 2 — Finished Stock Inventory is a balance sheet maintained for each product, showing sales, production and number of parts in stock.

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PRODUCTION ORDER No. P 1216

TO PRESS DEPARTMENT — DATE ISSUED 3/10/48 — SALES ORDER 10189

BY DHS

RACEWAY

PRESS 16,000 3646 Cover-

WELD Raw Material: 0.040x3.125 in. C-R Steel Coils, 1/4 Hard

ENAMEL (200 lb per 1000 Pieces)

SPRAY Total = 3200 lb

ASSEMBLE AND PACK

No. P 1216 3646 COVER DATE COMPLETED _____ BY _____

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LEFT

FIG. 3—Production Orders go to the foreman of the manufacturing department from the production controller to indicate materials to be used and to authorize production operations.

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Control . . .

In an Electrical Equipment Plant

Production control and scheduling can make or break plants handling a variety of small product orders. This article describes the methods employed in one plant, making electrical switch boxes, wiring fittings and other parts, to coordinate scheduling and to maintain accurate records of inventories, work in process and production costs.

By DANIEL H. SPOFFORD

Assistant Factory Manager,
Wiremold Co.,
Hartford, Conn.

PRODUCTION control and scheduling is much like a game of chess—a variety of men, machines and materials must be coordinated into peak efficiency.

It is rarely simple to determine the correct number of switch boxes, or other products, to be run. For that matter, it is difficult to establish what material is to be fabricated and what machines should be used in the operation. The production controller has to know every move that is going to be made in fabricating an article from the time the raw material arrives in the receiving room until the article is fabricated, painted, packed and shipped.

In determining the quantity to be run, sales of the article, which are kept in a Finished Stock Record, are consulted. The production run must be of enough pieces to make it economical to set up the machines. And material required for the production must be organized in order that the machines will not be interrupted or set up unnecessarily.

In these times of shortage, it is usually necessary to consider what other articles are to be made from the same type of material so that allocation can be made proportionately.

Overproduction is an easy-to-make mistake. Too large a run may prove uneconomical not only

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FIG. 4 — Raw Material Requisition order goes from the manufacturing foreman to the stockroom for necessary materials. After delivery, the requisition is sent to the production control department for inventory correction.

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MATERIAL REQUISITION

From RAW Stock For Order No. P1009 Part No. 3646 Cover Date 3/12/48

SALES SOLD BOXES ETC.	QUANTITY	DESCRIPTION	PURCHASE COST UNIT	PURCHASE COST VALUE	STANDARD COST UNIT	STANDARD COST VALUE	CODE
	3200 lb	0.040x3.125 in. C-R Steel Coils					
		(8 Coils)					
		No. 66 Press					

Requisition Issued By CFH Material Received By DHS Date 3/12/48

CLOCK NO. 720 | WIREMOLD PART NO. | DEPT. 3 | SHIFT 1 | THE WIREMOLD CO. TIME AND PRODUCTION TICKET

PRODUCTION 6000 | STANDARD 0.125 | INK | CLOCK NO | ORDER NO | PRODUCTION | EARNED HOURS | ST. TIME HRS. AMT. | BONUS HRS. AMT. | OVERTIME HRS. AMT. | TOTAL PAY | PART NO | OPER NO

EARNED HRS. | RATE | AMOUNT

ELAPSED TIME

Mar 12 - 8:00 A

Mar 12 - 2:00 6.0 B

NOTE: FOR CONSTANT WEEKLY OPERATION USE TIME CLOCK ON REVERSE OF THIS CARD.

800 per hr

S.T. HRS. | RATE | S.T. AMT

BONUS HRS. | RATE | BONUS AMT

O.T. HRS. | RATE | O.T. AMT

FOREMAN'S SIGNATURE CJOH

ORDER NO. P1009 | TOTAL PAY | PART NO. 3646 COVER | OPERATION NO. AND DESCRIPTION 10 / BLANK | MACHINE 66 | PIECES 16,000

IBM 752363-1M

FIG. 6 — Labor Ticket shows the time spent on each order. This data is kept on the Work in Process sheets and is forwarded to the accounting department for cost computations.

in piling up a costly large inventory, but in tying up tote boxes which should be kept moving and emptied to serve other parts. Also, obsolescence may catch up with overproduction to deflate the value of stockroom inventories.

A Kardex system, developed by Remington, Rand, Inc., has been found most efficient at the Wiremold Co., Hartford, Conn., for production control of sheet metal switch boxes and miscellaneous surface wiring fittings.

Fig. 1 is a monthly Record of Sales for a specific type switch box. This is used in estimating future sales and, hence, production requirements. Orders are issued normally about every four months and if there has been an abnormal amount of sales, building up a large backlog of orders, this can be determined from the Finished Stock Record, fig. 2, posted weekly.

The Monthly Sales Record is customarily kept attached to the back of the Finished Stock Record, which shows the following: (1) Influx of material to stock (quantity received); (2) customers' orders, posted weekly; (3) quantity owed customers (back orders); (4) quantities delivered (shipments); and (5) balance in stock.

Production Orders, fig. 3, are issued to start

WORK IN PROCESS

ORDER ENTERED 3/10/48 | ORDER NO. P1009

ORDER COMPLETED 3/19/48 | PART NO. 3646 COVER

PRESS DEPT. | QUANTITY ORDERED 16,000 | SALES ORDER 10189

STD.	800	700	900	1000	700	800					
	0.125	0.143	0.111	0.100	0.143	0.125					
DATE	NO. 10 BLANK	NO. 20 PIERCE	NO. 30 FORM	NO. 40 FOLD	NO. 50 ENAMEL	NO. 60 TAP	NO.	NO.	NO.	NO.	NO.
3/12	6,000										
3/13	6,000	5,000	4,000	4,000							
3/14	2,000	6,000	5,000	5,000							
3/15	2,000	1,000	2,000	2,000	5,000						
3/16		4,000	2,000	2,000	4,000	6,000					
3/17			3,000	3,000	2,000	2,000					
3/18					5,000	6,000					
3/19						2,000					

Raw Material: 0.040x3.125 in. C-R Steel Coils, 1/4 Hard (200 lb per 1000)

Total = 3200 lb

3646 Cover

FIG. 5—Work in Process sheets are kept in the production control department to show status of all orders.

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production rolling and to indicate the raw materials to be used. A white copy of this goes to the manufacturing department so that the foreman can schedule his machines. From the information on the order, the foreman will make out a Material Requisition, fig. 4, which is sent to the stock room for delivery of the necessary raw materials. A blue copy is sent to the accounting department for cost determination studies, and a yellow copy is kept in the production control department for future reference.

After all work on the order has been finished, the production foreman signs the white copy of the Production Order and returns it to the production control department so that the Work in Process sheet, fig. 5, can be closed out. From production control, the slip is routed to the accounting department to indicate that the work has been completed.

The Raw Material Requisition fig. 4, is sent from the production foreman to the stock room. After material is delivered, the requisition is sent to the production control department so that the quantity will be removed from the raw material inventory. Then, the requisition is forwarded to the accounting department for cost computations.

A labor or time and production ticket indicating the time spent on the order is shown in fig. 6. This is made out by the timekeeper in the manufacturing department and is sent to the production control group at the end of the run. Information on the ticket is posted on the Work in Process sheet, and the ticket is forwarded to the accounting department for use in making out the payroll and in determining total cost on the order.

After the work is completed, the Work in Progress sheet, fig. 5, is closed out and removed from the active file to a completed orders file.

Simultaneous Two-Color Enameling

FIG. 1—Chevrolet nameplate requires a black enameled area along the base of the top letters and red stripes and letters in the recesses of the lower bar.

PLATED automotive parts frequently require decorative enameling of recessed areas, and often involve more than a single color. For one such application, the Brown-Lipe-Chapin Div., General Motors Corp., plant at Syracuse has developed a double spray gun for the simultaneous enameling of a two-color job.

The part is the Chevrolet hoodside nameplate, fig. 1, which requires a black area along the top, and at a lower level has recessed letters and stripes that must be decorated with red enamel. The operation could be done with two masks used in succession with separate guns, but this would require two spraymen or one operator shifting from one gun to the other. In either case it would mean a lengthened cycle.

To speed the operation, the special setup in fig. 2 was devised. Two spray units fastened together, have been arranged for simultaneous use by one operator. A shield, above the mask and at right angles to its face, keeps each color separate. While spraying, the gun nozzles are kept inside the top edge of the shield and are moved together parallel to the shield edge.

Both mask and shield are cleaned after a number of sprayings in a central degreasing unit which handles the masks from all of the department's enameling jobs.

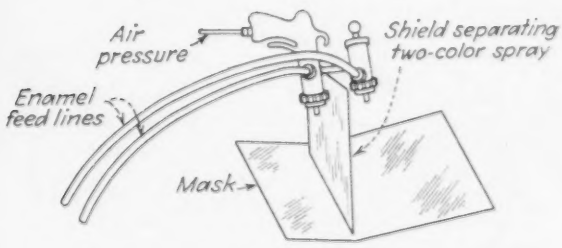

FIG. 2—In the photo an operator is shown spraying one of the nameplates. Sketch illustrates the principle of the dual spray system.

Compacting of Iron Powders

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An investigation conducted in Germany into the compacting of various iron powders is discussed herein. Influence of grain size and pretreatment of powder upon lowest possible compacting pressure, and density and strength of resulting compacts are the relationships stressed in this study.

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IN an effort to determine the influence of various factors on the compacting of iron powder, an investigation was conducted employing the following powders: Hametag powder, which is produced from small pieces of wire, further comminuted in a mill of special design; two powders produced by granulation; and three powders made by reducing iron ores. In one experiment an electrolytic powder was also tested for the purpose of comparison.

In the first series of experiments the effect of particle size upon the strength of the compacts produced was investigated. For these experiments Hametag powder was used. The powder as received from the mill was classified by sieving into four groups and annealed at 1472°F in hydrogen. Compacts were produced from the four ranges of particle size, the pressings having all the same density of 5.9 g per cc. Obviously, in preparing the pressings the compacting pressure had to be varied according to the particle size tested.

The tensile strength of the compacts in the pressed state as well as after sintering for 2 hr at 1922°F in hydrogen is recorded in table I. The results show that the compacting pressure which must be applied for forming a pressing of a definite density decreases as the grain size of the powder increases. The tensile strength of the compact increases with decreasing grain size.

In the following experiments the effect of annealing Hametag powder upon the density and the strength of the compacts was investigated. A mixture consisting of equal parts of grain sizes 0.06 to 0.15 mm and 0.15 to 0.30 mm was annealed at various temperatures between 1112° to 1652°F for 2 hr in hydrogen and the compacts made therefrom were tested in the pressed state as well as after sintering at 1922°F for 2 hr in hydrogen. The results, recorded in table II show

This is a summary of an article by F. Eisenkolb, which appeared in Stahl und Eisen, vol. 66/67, 1947, p. 78. Translation and preparation of the abstract was performed by Wilhelm Werner, Dusseldorf, Germany. —Ed.

TABLE I

Influence of Compacting Pressure on Tensile Strength of Various Grain Sizes of Hametag Iron Powder.

Grain Size, mm	Compacting Pressure, Psi	Tensile Strength, Psi	
		As Pressed	As Sintered
0.30 to 0.60	26,307	37	3,043
0.15 to 0.30	29,150	215	11,177
0.06 to 0.15	34,125	392	15,500
Under 0.06	45,505	397	18,486

TABLE II

Relationship Between Density, Compacting Pressure, Heat Treatment and Tensile Strength of Hametag Iron Powder

Annealing Treatment	Density, g per cc, at Various Compacting Pressures			Tensile Strength (in Psi) at Various Compacting Pressures			
	21,330 Psi	28,440 Psi	35,550 Psi	28,440 Psi		42,660 Psi	
				compacted	sintered	compacted	sintered
Not annealed	5.07	5.43	5.71	54	7,352	95	12,101
2 hr at 1112° F	5.09	5.40	5.74	77	8,006	139	12,940
2 hr at 1292° F	5.20	5.55	5.80	85	7,921	196	14,291
2 hr at 1472° F	5.24	5.57	5.83	100	9,968	198	15,884
2 hr at 1652° F	5.36	5.72	5.93				

that both density and tensile strength increase with increasing annealing temperature.

With temperatures higher than 1652°F the iron particles fritted together and it was difficult to separate them afterwards. These powders showed inferior pressing properties. It is, however, possible that the unfavorable effect of fritting is not so pronounced if annealing at temperatures over 1652°F is carried out only for a short time.

The effect of storing the powder before pressing or aging at low temperatures was investigated in further experiments, the results of which are recorded in table III. Only the density of the compacts was determined since it had been found that, with the same powder, there exists a distinct relationship between density and strength. [The formula underlying this relationship is not given by the author.]

The experimental figures given in table III show that the compactibility of the powder is somewhat deteriorated by storing or aging. The effect of aging may perhaps be ascribed to the fact that by this treatment adsorbed moisture is removed from the surface of the powder particles whereby the beneficial antifriction effect of the moisture film is lost. The same is perhaps the case when compressing the powder at low temperatures. It may also be assumed that storing and heating the powder give rise to the formation of oxide films which increase the friction between the individual particles thus necessitating a higher compacting pressure for attaining a definite density of the pressing.

Assuming this viewpoint to be correct it must be possible to procure the formation of adsorbed films during cooling the previously heated powder. Several experiments were therefore carried on in which the powder was heated to 257° and 392°F, respectively, and cooled in oil vapors. It was found that in each case the powder treated in this manner gave pressings which under the same compacting pressure showed a higher density than the compacts made from powders cooled in air.

Density and tensile strength tests do not reveal anything about the uniformity of physical properties throughout the whole body of the pressing; i.e., about the uniformity of pressure distribution during compacting of the powder. Several experiments were conducted to find a method

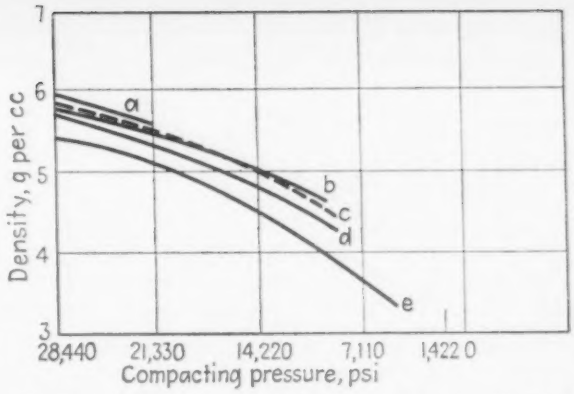

FIG. 1—Effect of compacting pressure on density of various grain sizes of iron powder; (a) = 0.30 to 0.59 mm (grain size), (b) = 0.75 to 0.29 mm, (c) = mixture 0.75 + 0.06 mm, (d) = 0.06 to 0.14 mm, (e) = under 0.06 mm.

which would reveal the behavior of a powder with respect to pressure distribution.

The following method was finally adopted. Pressings of a cross-section of 1 sq cm and a weight of 6 g were prepared in a double-acting die. The compacting pressure was then diminished in stages until the resulting pressing collapsed when taken from the die. The results of some experimental series are shown in figs. 1 and 2. Fig. 1 shows the results obtained with Hametag powder of various grain sizes. As could be expected, the pressings became stronger with decreasing grain size though the density decreased.

For example, with a grain size under 0.06 mm, a compacting pressure of 4266 psi proved sufficient to yield pressings which could be taken from the die without damage, whereas, with a grain size of 0.30 to 0.59 mm, a compacting pressure of 21,330 psi had to be applied. Fig. 2 shows the results obtained with powders made by different methods of manufacture. From the curves it can be seen that the powder obtained by granulation method A, which partly consisted of particles of a spherical shape, gave the highest density. Its workability, however, ceased at a much higher compacting pressure than that of the powders made by reduction methods, which gave pressings of sufficient strength even at very low compacting pressures. This may perhaps be ascribed to the sponge-like

TABLE III

Relationship Between Density, Compacting Pressure and Pretreatment of Hametag Iron Powder.

Pretreatment of Powder	Density, (g per cc) at Various Compacting Pressures		
	21,330 Psi	28,440 Psi	35,550 Psi
Tested immediately after annealing in hydrogen	5.11	5.48	5.70
Stored for 5 days	5.04	5.40	5.69
Annealed at 230° F for 14 hr, then cooled	4.95	5.37	5.62
Annealed at 392° F for 2 hr, then cooled	5.00	5.38	5.63
Compacted at 122° F	5.03	5.36	5.68
Compacted at 212° F	4.99	5.36	5.68
Compacted at 302° F	4.85	5.21	5.53
Compacted at 392° F	4.86	5.22	5.42

TABLE IV

Merit Numbers Assigned to Iron Powders Calculated from the Ratio of Density to Lowest Possible Compacting Pressure.

		Merit Number*
Hametag Powder;	0.30 to 0.60 mm	4
	0.15 to 0.30 mm	7
	0.06 to 0.15 mm	7
	finer than 0.06 mm	11
Granulated Powder	A	7
	B	11
Electrolytic Powder		7
Reduction Powder	A	33
	B	27
	C	20

* Compacting pressure expressed in tons per sq cm.

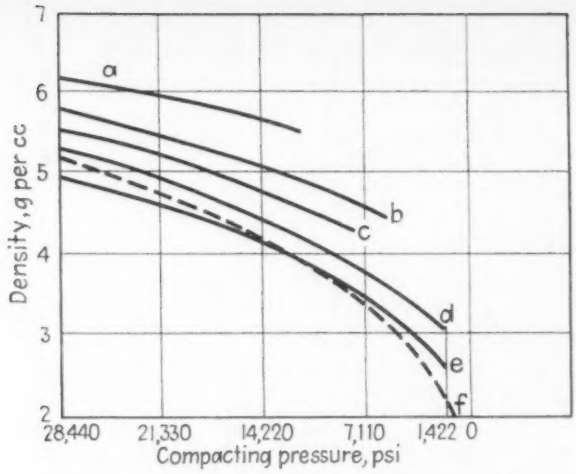

FIG. 2—Effect of compacting pressure on density of various iron powders manufactured by different methods. Methods of manufacture: (a) = granulation A, (b) = granulation B, (c) = electrolytic iron, (d) = reduction A, (e) = reduction B, (f) = reduction C.

structure of the reduction powders.

A well-known method of reducing friction and increasing uniformity of pressure is the use of a lubricant. In earlier experiments yellow resin proved very successful as an addition agent in the manufacture of articles that were difficult to press. It was found that artificial resin in amounts of 0.5 pct proved as efficient as yellow resin. In both cases a compacting pressure of 10,665 psi gave pressings of sufficient strength. With graphite on the other hand, in amounts of 1 pct, the compacting pressure had to be increased to 12,798 psi in order to get pressings that could be taken from the die without damage.

The experiments referred to above in which the effect of storing the powder upon the density and strength of the resulting pressing was investigated, were completed by further experiments in which the lowest possible compacting pressure was determined which had to be applied for obtaining pressings of sufficient strength. Hametag powder of medium grain size was used in these experiments, and it was found that with freshly annealed powder the lowest compacting pressure was 4977 psi. The same pressure proved sufficient when the powder had been stored for 2 and 4 days, respectively. After storing the powder for 6, 8 and 12 days, respectively, the pressure had to be increased to 5688 psi; and a further increase to 7110 psi was necessary when the powder had been stored for 16 and 20 days.

In several experiments on a commercial scale it was found that the compactibility of a powder was not always the same, though screen analysis, loading weight, and chemical composition complied with the specified values. This behavior may be ascribed to slight variations either in the annealing treatment or in the screen analysis. In order to assess the usefulness of a powder in a minimum of time the author proposes to test the compactibility only under a few definite pressures, as for example, 4266, 7110, 9954 and 12,798 psi.

According as the higher or the lower pressures must be applied to give a compact of sufficient strength, the powder must be given back for re-annealing or re-sieving, or can be used for routine work or special purposes. A further proposal of the author is to use a merit number for comparing the value of different powders with one another. This number is represented by the ratio of density to lowest possible compacting pressure. For the powders tested in the foregoing experiments the merit numbers listed in table IV were found.

Aluminum Bronze Alloys

(CONTINUED FROM PAGE 79)

test cycle would determine the degree of attack, or, if an adherent scale developed, it was regarded as probably protective.

These investigations indicated the following:

(1) All alloys except silver-bearing showed resistance to some extent, but the aluminum bronzes were the most resistant, being almost immune to attack.

(2) Introduction of 10 pct H_2O vapor made little difference to the relative scale rates, with aluminum bronze excelling.

(3) The presence of 0.1 pct SO_2 increased attack on all materials except the high aluminum bronzes and the silicon bronzes which were not affected.

(4) Increase of the sulphur dioxide to 5 pct showed pronounced attack on all alloys except the 10 pct Al, 3 pct Fe, and the 2 pct Al bronzes which still did not exfoliate.

(5) The presence in small amounts of moist hydrochloric acids had a marked accelerating affect on all test samples, but the aluminum bronzes, particularly those with high aluminum content, experienced only a small fraction of the sealing of other materials.

The curves in fig. 4 illustrate the scaling results for aluminum bronzes in dry air containing 5 pct SO_2. Low aluminum content alloys of 2 pct and 5 pct do not qualify, but the 12 pct Al and especially the 10 pct Al plus 3 pct Fe have no exfoliation; they seem rather to develop an adherent protective coating through additional exposure cycles.

The data that has been given in the article is in no sense final. Research and development is continuing and new aluminum bronze alloys and refinements of presently known alloys may be expected. The aluminum bronzes as a class have long since outgrown the development stage and they are now available in grades and forms required to meet all usual conditions. Utilizing the close production controls developed over the past quarter century, these series of alloys are now available as sand or centrifugal castings, forgings, wrought rods and tubes, rolled sheet and even a full line of electric arc weldrods in a complete series of alloys.

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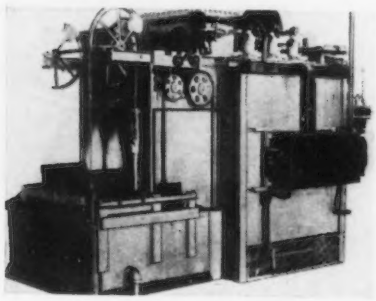
New Production Ideas . . .

New and improved equipment and methods described this week include: A batch type furnace, drilling machines, straight side presses, a general purpose hammer, screw slotters, flame machining, a sheet edge positioner, a surface abrasion tester, portable impact wrenches and electric polishers, heavy duty chucks, milling cutters, weld nuts, and a liquid stainless steel.

Batch Type Furnace

A NEW batch-type furnace eliminates liquid bath treatment of automotive production parts. With a rated capacity of 600 to 700 lb per hr, a uniform case depth has been produced throughout the furnace load with a variation of ±0.0005 in. on a 0.003-in. case. Operating costs have been less than ½¢ per lb of steel treated. Design features of this unit include a screw drive mechanism for loading and unloading the furnace; higher speed of heating by means of 6 U-type radiant tubes surrounded by a heat capacitor. A gas



generator system of catalytic type is incorporated in the radiant tubes to supply a gas neutral to medium high carbon steels. Safety controls, oil circulation and oil cooling equipment, 1½ hp drives for inner door and quench tank elevator, circulating fan, and gravity roll tables for stock handling are additional features. Floor space is approximately 7½ ft x 12½ ft, requiring head room of 13½ ft. *Dow Furnace Co. For more information, check No. 1 on the attached postcard.*

Drilling Machines

FEATURING increased operator efficiency with the V-belt drive direct from the motor to a four-speed geared transmission which is part of the top frame assembly, the Model D drilling machine is offered in 24 and 28-in. swing with a 24-in. head travel on column and 11-in. spindle feed. Ease in changing speeds is gained by an inching button on a four-station switch, and the four-speed transmission lever. Three ranges of spindle speeds are available for Models D-24 and D-28 drilling machines: 21 to 365 rmp; 25 to 419 rpm; and 37 to 650 rpm. Feed mechanism is driven directly from the main drive shaft through a steel feed worm and bronze worm gear. The rack pinion and shaft are made in one piece from alloy steel. The motor is 5 hp and provides ample spindle power for the recommended capacity of 1¾ in. in mild steel. Machines are equipped with electrical reversing for tapping. An adjustable stop collar on the graduated quill trips the feed at desired depth. *Sibley Machine & Foundry Corp. For more information, check No. 2 on the attached postcard.*

Tap and Drill Grinder

A LINE of combination tap and drill grinders combines all the advantages of the Grand Rapids tap grinder with those of their drill grinder, but costs less and requires half the floor space. Machines are built around a heavy rugged, one-piece column and base casting that is machined to take the greased-for-life precision ball bearing spindle. Either right or left hand 2, 3 and 4 flute taps may be sharpened with equal facility, and the holder may be adjusted to grind a very blunt taper such as required for bottoming taps, or the long taper necessary for tapper taps. A diamond truing device is provided for dressing the tap grinding wheel. The twist drill grinding attachment is suitable for sharpening 2, 3, and 4 flute twist drills with straight or taper shanks. *Gallmeyer & Livingston Co. For more information, check No. 3 on the attached postcard.*

Straight Side Presses

NEW all welded, straight side presses are manufactured in both the single and doublecrank variety. The machine illustrated, is a double-crank single geared tie rod frame press having a rated capacity near bottom stroke of 185

tons. With both single and double geared machines, the high speed shaft and flywheel with electro-pneumatic clutch are mounted within the crown above the crankshaft. Bearings on each side of the back-shaft pinion is said to prevent shaft deflection. This gives better gear tooth contact reducing gear noise and wear. Use of a five-way clutch control is optional on machines equipped with electro-pneumatic friction clutch. With this device it is possible, by setting a selector switch, to operate the press with front and rear buttons, with front buttons alone, rear buttons alone, continuously or by jogging

when setting the tools. *Niagara Machine & Tool Works. For more information, check No. 4 on the attached postcard.*

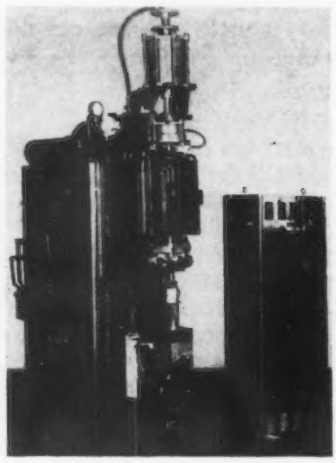
General Purpose Hammer

A PRACTICAL general purpose hammer, made in a range of sizes from 50 to 500 lb falling weight, can handle a wide variety of jobs from tool dressing and general light blacksmithing to emergency forging of repair parts or maintenance work. Where dies are employed, accurate work is assured by the integrated frame and anvil cast in one piece, preventing rock or sway. A new, automatically lubricated, powersaving cylinder cuts operating costs; and the new heat treated, ground face, alloy forged steel flat dies make work manipulation easier and enable the hammer to forge the tougher steels with fewer redressings. A self-seating rotary type valve directly

connected to the throttle control gives greater air or steam efficiency and is one of the features attributing to economy on applied power. *Chambersburg Engineering Co. For more information, check No. 5 on the attached postcard.*

Balanced Load Welding System

STANDARD Thomson spot, projection, seam and flash welders and special-purpose resistance welders are now available with a Balanced Load, three-phase converter system which supplies low frequency, single-phase current for resistance welding while placing an evenly balanced moderate demand on a standard three-phase, 60 cycle, 220, 440, or 550 v primary power source. It offers advantages when welding work requiring deep throat machines or the introduction of large masses of material within the secondary circuit. Except for a special transformer, resistance welders using this converter system are conventional in design and existing machines may readily be adapted to use this method of



power application. All additional equipment required is housed in a single, compact cabinet which also includes synchronous timing, heat and sequencing controls and the power converting unit. *Thomson Electric Welder Co. For more information, check No. 6 on the attached postcard.*

Tripping Mechanism Control

CONTROL of tripping mechanisms on punch presses, riveting machines, shears, spot welders, and air presses is possible with a new two-hand easy-to-operate electrical device. Light touch actuation —10 to 18 oz—reduces operator fatigue. Known as Microtrip, the device requires that both hands touch the switch buttons in order to operate the tripping mechanism. If both switches are not actuated at the same time, the electrical circuit controlling the tripping mechanism becomes inoperative. Microtrip consists of a control box, two precision switches, and the tripping mechanism. *Micro Switch. For more information, check No. 7 on the attached postcard.*

Screw Slotters

BUILT primarily for slotting heads of standard or special screws, a new semi-automatic screw slotter may also be adapted to special light milling operations on ends of uniform pieces. Speed and feed combinations may be arranged for cutting soft brass or tough steel. A set of back gears between the driving spindle and the saw carrying spindle allow a variation of cutting speeds for slotting saws and the drive to the work holding spindle is through a compound train of change gears. The machine will slot fillister and button head screws, 3/8 in. diam and 2 in. long; flat head, 5/16 in. diam and 2 in. long, headless, 1/2 in. diam and 1 1/2 in. long. Greatest depth of slot is 1/2 in. Standard diameter of saw is 2 3/4 in. and width of slot is governed by saw. *Kent Machine Co. For more information, check No. 8 on the attached postcard.*

Flame Machining

FAST replacement of worn cast iron or cast steel sprockets and gears by flame machining is said to produce sprockets from steel

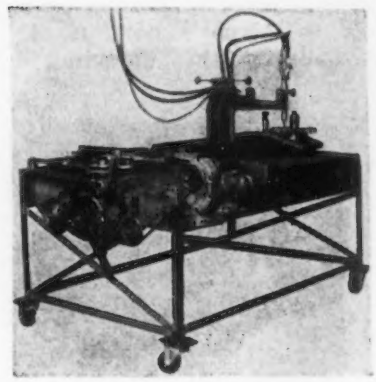


plate in as little time as 5 min for a 12-in. sprocket. Employing a pantograph principle, an oxygraph cutting head assembly mounted on a track is moved forward and backward by mechanical linkage. Such movement is transmitted by following the contour of one of 20 basic cams, the design of which reflects standard and special sprockets and gears. The cutting head is led into the path of a revolving steel blank whose turning rate is related to the speed of the cutting head. Through combinations of cams, changes in the position of the pantograph legs, and substitution of various standard size driving gears, it is claimed more than 5000 types and sizes of sprockets and gears can be flame machined to a greater

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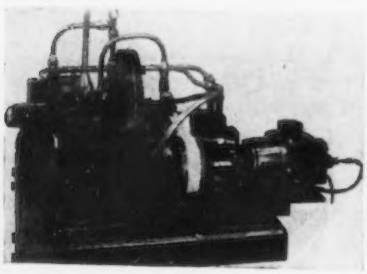
accuracy in pitch, concentricity, and contour than obtained by casting. As each sprocket or gear is flame machined, the wearing surface of each tooth is said to be toughened, according to the characteristics of the metal, and further machining is not necessary. *Cogmatic Co. For more information, check No. 9 on the attached postcard.*

Sheet Edge Positioner

THE edge position of any sheet-like material entering a process over rollers can now be automatically controlled within limits as narrow as ±0.05 in., by a combination of Askania standard control components, with the addition of a pair of air nozzles. Air from one nozzle is received by the other which is connected to the dia-



phragm of a pressure regulator. The sheet moving between the air nozzles cuts a certain amount of the flow of air to give an impulse to the diaphragm. This impulse is transmitted to the diaphragm of the regulator, which supplies power to a cylinder to change the position of the sheet on the roller by pivoting the axle of the roller or by moving it from side to side. This control is recommended for any process in which coating, coiling, or an endless belt conveyer is used. *Askania Regulator Co. For more information, check No. 10 on the attached postcard.*

Abrasion Testing Set

DETERMINING wear resistance of electroplated, porcelain enamel, organic coating, glass, and plastic surface finishes is possible with a new abrasion testing set that incorporates a rotary abrading action on a 4-in. specimen. The wear results from alternately rubbing the flat faces of two resilient Calibrase wheels over the surface being tested. New features include an improved suction pump with a vertical dust receiver with swinging nozzle fully adjustable for any thickness specimen. The

control panel is equipped with an adjustable timer to provide a test period of 1000 cycles or less, and then automatically shutting off the power. The control unit is equipped for dual operation. *Taber Instrument Corp. For more information, check No. 11 on the attached postcard.*

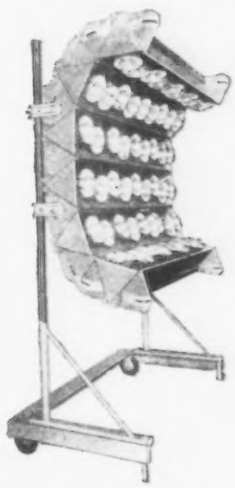
Tractor Shovel

APPLICATION of four wheel drive principle to a tractor shovel is announced with the introduction of the Model HM Payloader. This unit, largest of the line, has a bucket capacity of 1½ cu yd and a static loading capacity of 6000 lb. Four wheel drive is provided for off-road power, traction and flotation. Power steering on rear wheels simplifies steering and short wheelbase and fully-reversing transmission with four

speeds in either direction offer maximum maneuverability. Bucket raising, lowering, dumping and closing are accomplished by double acting hydraulic rams. Automatic quick tip-back of the bucket is provided as it is raised so that heaped loads can be retained without spillage and carried low for good machine balance and operator visibility. The 76-hp engine provides top speed of 16 mph. It is equipped with 14.00-24.00 road builder tires. The machine digs, loads and performs operations of bulldozer. *Frank G. Hough Co. For more information, check No. 12 on the attached postcard.*

Portable Infra-Red Oven

NEW Instant-Shape portable infra-red ovens are adaptable to dry any shape article as each row of lamps has adjustable construction that permits the entire lamp assembly to be shaped to obtain maximum infra-red heating efficiency. The oven can be formed

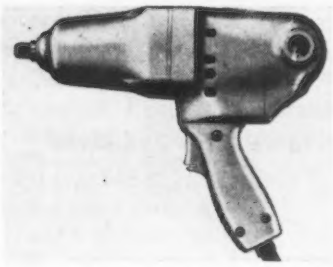


into a complete circle by bringing the top and bottom rows together. R-40 high efficiency reflector lamps are used and lamps are slightly staggered for even heating. Units are available in sizes from 3 to 10 rows. *Wil-Son Mfg. Corp. For more information, check No. 13 on the attached postcard.*

Impact Wrenches

A NEW line of portable electric impact wrenches tightens or removes either left or right-handed nuts, bolts, and cap screws. This tool, rated at ⅜ in. thread diam, spins a free running nut or bolt to a seating position, with a high speed, direct-drive action, then within a matter of seconds a rapid, rotary hammering action drives the nut or bolt to maximum tightness. In removing a fastener the hammering action loosens the nut or bolt, and the direct-drive rapidly

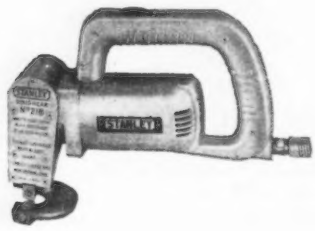
spins it free. Light weight and minor torque reaction reduce operator fatigue. The wrench is made of aluminum castings and has a B & D universal motor. Besides



having a side handle with automatic-release switch, reversing switch, and a three-conductor cable and plug, the wrench may be obtained with six hexagon sockets ranging from 9/16 to 15/16 in. *Black & Decker Mfg. Co. For more information, check No.* 14 *on the attached postcard.*

Shear

THE No. 218 Unishear has been designed to cut 18-gage mild steel and other materials in proportion at speeds up to 15 fpm. Improved blade action is said to feed in the work so that little effort is required to cut straight lines, angles, curves and notches. Features listed include ball and roller bearing construction, automatic lubrication of plunger from gear



housing, slide operated switch and minimum number of moving parts. The shear weighs 4¾ lb and is furnished with cable, wrenches, clearance gage and supply of lubricant. *Stanley Electric Tool, Div. Stanley Works. For more information, check No.* 15 *on the attached postcard.*

Portable Electric Polishers

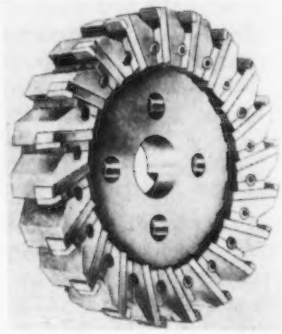
IMPROVEMENTS in the Van Dorn line of portable electric polishers provide more power and easier operation. Both standard and automatic models have had the gearing changed to a single reduction, spiral bevel gear, increasing the motor power approximately 30 pct and the speed to 1500 rpm. On the automatic polisher the pump operation has been improved to include a lever that reduces operator fatigue and make it easier to reach than the plunger button formerly used. Both polishers are equipped with a 7-in. molded rubber pad, a 7-in. sponge rubber cushion pad, a lambswool buffing pad, a rocker-type switch, and a reversible side handle for either left or right hand operation. *Van Dorn Electric Tool Co. For more information, check No.* 16 *on the attached postcard.*

Liquid Stainless Steel

WITH the development of a new product called Liquid Stainless Steel, it is possible to apply a coating of pure stainless steel to any surface, by brushing or spraying. Stainless steel is broken down into flakes so fine that it flows almost like a liquid and this material is incorporated in a liquid plastic and solvent to bring it to brushing consistency. The product combines the durability of stainless steel with the water and chemical resistance and easy cleanability of plastics. It can be used on all wood surfaces exposed to fresh or salt water or spray, and in industrial uses for decorative or protective purposes. *Lockrey Co. For more information, check No.* 17 *on the attached postcard.*

Milling Cutters

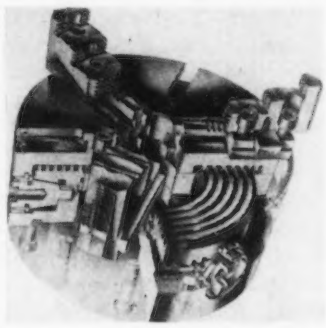
TWO inserted blade face-milling cutters added to the Nelco line include an extremely fine pitch face-mill for use primarily on cast iron, brass and bronze, with interchangeable blades for use on any material, and a mill designed to use standard carbide tipped lathe tools. The first mill features an adjustable blade to which a carbide or cast alloy tip is brazed. Although the tool can be resharpened with regular single point tool grinding equipment, it is recommended this tool be reground on a tool and cutter grinder for best performance. The second face-mill, designed for carbide tipped lathe tools, can be set up as a conventional cutter or a step cutter for use on older equipment and where a wide variety of work is done. Both tools can be operated with fewer teeth on lower powered millers by pushing teeth back into body. These tools are available in



sizes from 6 to 14 in. diam. *Nelco Tool Co., Inc. For more information, check No.* 18 *on the attached postcard.*

Heavy Duty Chucks

A LINE of extra heavy-duty, three-jaw geared scroll chucks developed for higher rates of metal removal are made with serrated step-along jaws or with American Standard tongue and groove jaws. They are built in 8, 10, 12, 15, 18, 21 and 24-in. sizes, and fit 6 to 15 in. American standard flanged spindle noses of any machine. Chuck body is forged from high carbon steel and back plate is cast iron for shock absorbing. The scroll is ma-



chined of alloy steel, hardened to 430 Bhn. Bronze bushings are used at wear points and scroll and pinions are provided with replaceable bushings. Pinion and scroll teeth are designed to avoid uneven load concentration and metal deformation. The serrated jaw chuck has master jaws with limited travel, major adjustments being obtained by positioning the reversible top jaws. *Warner & Swasey Co. For more information, check No.* 19 on *the attached postcard.*

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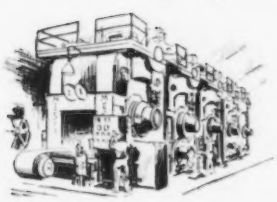
MESTA 50th Anniversary

November 21, 1898 . . . . November 21, 1948

Mesta celebrates the completion of the first half century of its participation in American industrial progress and wishes to express its appreciation:



To the iron, steel, aluminum, copper and the many other industries for their patronage, their spirit of cooperation and their continued confidence in Mesta for the development of new techniques and the design and manufacture of modern equipment.

To our country's armed services for the reliance they have placed in Mesta for the design and manufacture of equipment to meet their special requirements.

To our employees, whose loyalty, industrial initiative and ability have been so large a factor in the success of the company and the service which it has been proud to render to our nation and to world-wide industry.

MESTA MACHINE COMPANY, PITTSBURGH, PA.

Assembly Line . . .

WALTER G. PATTON

• New Buick follows postwar styling but retains the individuality of its present models . . . Car is 3 in. shorter but has more room for passengers . . . Ford lights its new 1400 ton blast furnace.

DETROIT — The new 1949 Buick making its debut this week follows the now well-established trend of postwar car styling: full length fenders, a lower and wider grille, curved windshield and increased glass area. In contrast to other new postwar cars, however, the new Buick weighs slightly less than the predecessor model. Weight reduction is made possible by a combination of new type springing and complete redesign of the front seat and floor pan. As a result of this engineering change, overall length of the car is reduced by 3 in. At the same time, the leg room in the rear compartment is increased by the same amount. A new footrest, incorporated in the floor and the back of the front seat, gives additional leg room even when the front seat is moved back.

In contrast to some other new cars, headroom of the new models has been increased about ½ in.

The 1949 Buick models will employ the GM "C" body with many individual characteristics added by Buick. The Buick identification and individuality features have been well preserved in the new model, especially in the hood and grille. Numerous changes in the frame were required to achieve the increased passenger accommodations, it is reported.

All but two of Buick's 11 lines of cars are included in the model change. All Roadmaster and Super Buicks are affected; the Buick Special Series is not yet ready for introduction.

An addition to the 1949 Buick line is the Riviera, a steel top convertible that doesn't "convert." Instead, the Riviera offers the buyer all the styling advantages of the convertible and, as some automobile engineers will admit, "the owner gets increased protection without the rattles." Production of this new hard top convertible is scheduled for late spring, 1949. (It will be recalled that Kaiser-Frazer has also introduced a new hard top convertible recently.)

Buick engineers have indicated more than 100 mechanical advancements are incorporated in the new cars. Compression ratio of the engine has been boosted from 6.6 to 6.9.

A new "tailor-made" Dynaflow transmission has been designed to fit the Buick Super engine. Buick engineers say the torque-converter unit had to be completely redesigned to fit the Super powerplant. A considerable amount of new tooling is involved. Next year the Dynaflow will be standard on the Roadmaster series and optional on the Super series. It will also be optional on the new Special series scheduled for introduction "some time next spring."

Since introducing the Dynaflow drive last January, Buick has produced 60,000 of these transmissions.

Major engineering changes in the 1949 Buick Super and Roadmaster models include thicker section door posts, more extensive use of "double-walled" body construction and a huskier X-type frame.

The instrument panel is entirely new and all instruments and push-pull controls are located on the left side. Dials are recessed to minimize reflection.

NEW box-type hinges permit an increase of door openings from 75° to 90°. A new heating and ventilating unit has 25 pct larger core than the earlier models. The front seat is 3 in. wider.

Rear lamps are contoured into the after edge of the rear fenders. Each lamp serves as a stop light, tail light, directional signal and reflector. Built-in backup lights are standard on Roadmaster cars and optional on the Super models. Front and rear coil spring rates have been reduced to provide a softer ride. The rear coil spring mounting has been moved to a position slightly to the rear of the axle center. Buick continues to use "frequency-controlled" engine mountings and low pressure tires with extra wide rims. The 1949 models have rims that are a full inch wider than conventional type wheels.

One of the most interesting innovations is a Buick-designed valve lifter that keeps all 16 valves correctly set and silently operating. Valve clearance is held at zero. According to Buick engineers, tappet noise is eliminated, even during engine warmup. The new valve lifters are standard equipment on the 1949 Buick Super and Roadmaster models equipped with Dynaflow drive transmissions.

•

Ford Motor Co. Almost Doubles Their Capacity With New Blast Furnace

Detroit

• • • **Top executives** of the Ford Motor Co. were present this week when its new 226-ft blast furnace was lighted. The new stack has been formally designated as the "William Clay Ford." Other Ford blast furnaces are the "Henry" and the "Benson."

Informed sources believe Ford

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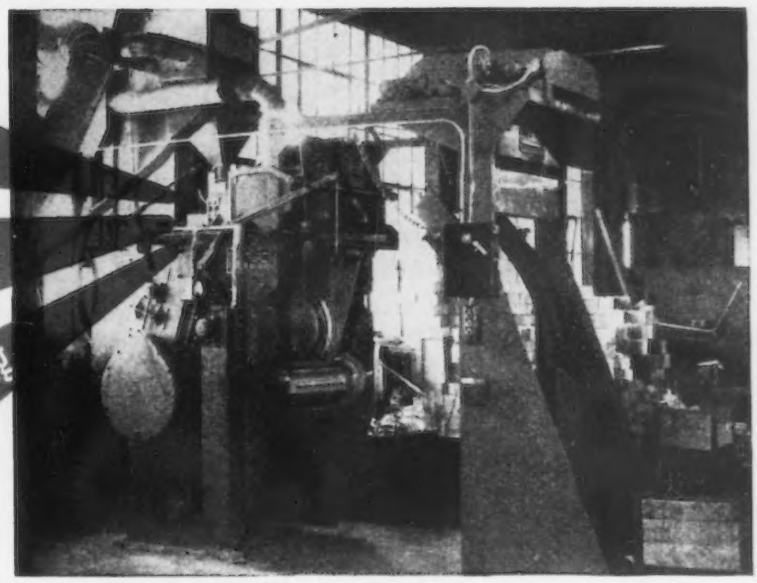
The Airless Wheelabrator
Abrasive Blast Cleaning Process

Replaces 4 Tumbling Mills

Provides a perfect anchor for galvanizing and japanning

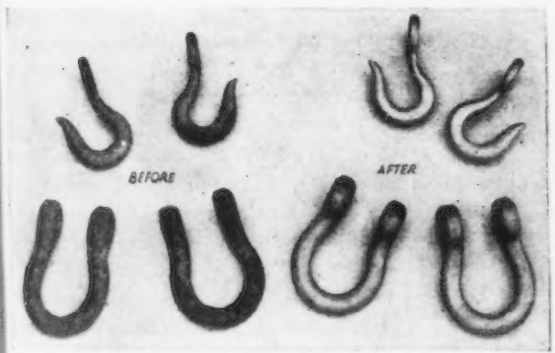
Eliminates Pickling prior to Galvanizing



The many savings that accrue from the use of the Wheelabrator method of Airless Blast cleaning have been proved again. Installation of a 27" x 36" Wheelabrator Tumblast (5 cu. ft. capacity) at the Boston & Lockport Block Co. of East Boston, Massachusetts, completely revolutionized their cleaning operation. Loads averaging 400 lbs. of forged steel tackle blocks are now cleaned in ten to fifteen minutes. By previous methods, even smaller loads had to be tumbled for 20 minutes and then pickled for a period of one to eighteen hours, depending upon the type of forging.

With the installation of the Wheelabrator, it was soon discovered that FOUR tumbling mills could be eliminated and pickling discontinued, for all pieces which could be Wheelabrated. In addition, the thoroughness and uniformity of the Wheelabrated surface provided the proper "anchor" to bond the galvanizing and japanning finish required.

Wherever the Wheelabrator is put to work it is slashing cleaning costs to new rock bottom lows. At the same time it scours the work uniformly clean in every fillet, recess, pocket, and cavity . . . right down to the gleaming virgin metal.



Typical WHEELABRATOR users in the Heat Treat and Forge Industry

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WHEELABRATOR & EQUIPMENT CORP.
(Formerly American Foundry Equipment Co.)
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ROTARY CRADLE: *A rotary cradle method for conveying automobiles through the painting process has been installed at a new paint finishing plant of the Austin Motor Co., Birmingham, England. Special cradles carrying the bodies are suspended from an overhead conveyor traveling 7 fpm. Photo shows the main color spray booth.*

has invested in excess of $8 million in the new furnace which is expected to approximately double the company's present output of pig iron.

Hearth diameter is 27½ ft. The new blast furnace is expected to add at least 39,000 net tons of pig iron to Ford's present production of 43,000 net tons per month.

Approximately 6000 tons of steel were used in the construction of the new furnace. More than 600 freight car loads of brick were used to line the casing, the three stoves and down comers and in building a new cast house.

The new "C" blast furnace is located directly north of the present "A" and "B" furnaces.

The Ford expansion program is a major move to step up Ford's steel production which will, in turn, permit greater automotive output. At the present time, Ford output has been held considerably below plant capacity because of the company's inability to obtain steel.

In addition to construction of the new blast furnace, Ford is building three open-hearth furnaces and has added facilities in the rolling mill. It has been necessary to enlarge ore and raw materials storage docks substantially.

Ford is using a 519 ft long ore-and-coal handling traveling bridge crane to serve the new furnace. A 17-ton ore unloader, a blast furnace turbo blower, two transfer cars for ore and coke, a 400-ton hot metal railroad track scale, seven 400 cu ft slag ladles with pots and five 150-ton capacity torpedo-type hot metal railroad cars have been added. The new torpedo-type cars will permit faster dispatch of hot metal because of larger tonnage capacity and improved heat conservation.

The new "C" blast furnace will be fed by 15-ton skip hoist cars and average cars will consist of 39,000 lb of iron ore, 18,000 lb of coke and 7500 lb of limestone. Approximately 140 charges can be dumped into the new blast furnace during a 24-hr period. Blowers will furnish 280,000 cu ft of air per minute.

Ford expects to use approximately 55 pct of its blast furnace gas in its coke ovens, 20 pct to reheat the hot air stoves and 25 pct will go to power house burners.

About a third of the present Ford cement plant had to be torn down to make room for additional iron ore storage bins. Ford also found it necessary to transfer some of its large coal storage to Miller Road, south of the production foundry. Two new ladle pits will be housed in an extension now being added to the south end of the open-hearth building.

Stress Consumer Relations

New York

• • • **There's a new trend** in business relations in anticipation of a coming buyers' market. Emphasis is being shifted from public relations activity to customers relations, according to the latest survey of current business practices conducted by the National Industrial Conference Board. No other significant changes in overall policy are in general being contemplated.

Most executives feel that the present programs have undergone little change since the end of the war. However, 10 pct of the group find a greater need for public relations at all levels.

A few companies point to labor difficulties as a factor influencing management's decision on this score. In two instances the launching of new projects resulted in establishment of public relations departments.

Willys-Overland Planning Some Overseas Expansion

Toledo, Ohio

• • • **Overseas assembly** facilities for Willys-Overland vehicles will be inspected during the next month by Cyril Wilson, manager of technical services of the Willys-Overland Export Corp.

Mr. Wilson is also assigned to give technical assistance to Willys-Overland overseas distributors in the establishment of new assembly plants, and to advise on service problems and engineering phases of the special adaptations of the Jeep for agricultural and industrial use.

New plants for the assembly of Willys-Overland vehicles are contemplated for Amsterdam and Paris.

In the Far East a new assembly plant for all models in the Willys-Overland line is scheduled to come into operation in Bombay in February, 1949. The plant will be owned and operated by Mahindra and Mahindra, Willys-Overland distributors for India. R. J. Mara, of the Willys-Overland Motors plant engineering department, has been given a leave of absence to serve as technical adviser in starting operations at the new assembly plant.

Another assembly plant is scheduled for Batavia early in 1949.

Mr. Wilson's inspection tour will reach Ireland, England, Denmark, Holland, Belgium, France, Switzerland, Italy, Turkey, India, Egypt, and Portugal.

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STOKES KNOWS HOW

Washington . . .

EUGENE J. HARDY

• Control legislation being prepared . . . Allocations of some sort appear definite . . . Standby powers likely to result . . . Commerce takes mild view.

WASHINGTON—What is Congress going to do about price and allocation controls? This is the $64 question plaguing industry at this time, with allocation controls of particular concern to the steel industry. While Mr. Truman's Administration is committed to asking for allocation controls on steel this matter will not be one of solely partisan politics. The steel industry was in for a rough time even if the Republicans had emerged victorious in the recent election. More than one Congressional committee in the Republican-controlled 80th Congress gave the industry a thorough going-over.

A quick look at the situation at this early date indicates that all is not as black as is supposed in some quarters. The Commerce Dept. has already been told to work on control measures for presentation to the White House. With its experience in the handling of voluntary allocations the department is expected to come up with some relatively mild proposals.

Whether the President will accept these proposals or feel that he must propose, and anticipate getting, a completely regimented peacetime economy is a moot question. The odds are against it at this time. As one Commerce Dept. official put it: "What the President proposes, hopes to get, and actually gets from the Congress are likely to be three very different things."

As far as steel allocations are concerned, it is now apparent that there are four courses of action open to the 81st Congress which convenes in January:

Congress may (1) direct the President to put a program of compulsory allocations into effect immediately, (2) authorize the President to put such a program into effect on individual commodities as it becomes necessary, in other words, standby controls, (3) simply extend the present program of voluntary allocations beyond its Feb. 28, 1949, expiration date, (4) do nothing.

FROM a practical political viewpoint, it is plain that the first and fourth courses of action are the least likely to be followed. This narrows it down to the second and third, and a combination of these two appears to be the most likely result at this time.

In fact, the Commerce Dept. is almost certain to recommend a continuation and strengthening of the present voluntary allocations scheme, plus standby allocations and price powers.

This plan of action is similar to that asked by the President earlier this year. This earlier anti-inflation program was presented to the Congress by the then Secretary of Commerce, W. Averell Harriman. Mr. Harriman at that time pleaded for controls on a standby basis. Give the President these powers, he asked, and they will be put into effect only if "absolutely necessary."

Congress, of course, turned thumbs down on this proposal. Both the Senate and House apparently felt that Mr. Truman and Mr. Harriman would have lost little time in making full use of their new powers.

So it looks as though the same proposition is about to be made again. Members of Congress who vote for the proposed program can always take themselves off the spot by explaining to constituents that they did not vote for controls as such, but only for the authority to use such controls if it should become "absolutely necessary."

Critics of such a program point out that it's a poor New Dealer who fails to make fullest use of the administrative authority granted him or his agency or department. With the possible exceptions of the Treasury Dept. and the Federal Reserve Board, the record of the executive branch of the Federal Government for the past 16 years clearly shows that authority voted by Congress has generally been exercised in toto.

Administration supporters, however, say that this is all different now and point to the fact that the President chose not to exercise the compulsory allocation powers over steel contained in the 1948 Draft Act.

THE present Secretary of Commerce, Charles Sawyer, is not control-minded and this belief is reflected throughout the department. Officials now working on the program to be presented to the President told THE IRON AGE that the department's experience with voluntary allocations of steel indicates that a continuation of voluntary allocations plus standby powers will be sufficient to handle urgent and critical industrial needs. They feel that the standby powers, plus some changes in the voluntary allocations law will be more than enough to induce steel and other industries to go along.

Several of the voluntary allocation programs, pig iron for housing and the warm heating equipment plan, for example, have run into rough weather. Commerce officials feel that with additional supervision the programs would work more smoothly. It is also hoped that, if Congress extends this law, authority to hire dollar-a-year men will

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be granted. Congress is also likely to be asked to broaden the scope of the voluntary allocations program and grant to participating firms more leeway within the limits of the present antitrust exemptions.

As part of its justification for continuation of the voluntary allocations set-up, Commerce is now working on a big study of the impact of voluntary allocations. It is hoped that this study will show the dangers in allocating too much of an important industrial commodity and also the exact amount of steel which the program has diverted from other uses.

Summing up, it appears at this time that the Commerce Dept., which is the likely agency to administer any system of allocation and price controls, is looking at the situation in a level-headed manner. Its recommendations to the President will surely reflect this view.

Generally speaking, top-level Commerce officials feel that controls cannot end shortages, but can be used to channel materials to essential segments of the economy. Hence, their belief that voluntary allocations of steel will do the trick, rather than risk putting countless firms out of business by a governmental pie-cutting of available steel supplies. This would further add to gray market activities, and would have a considerable inflationary effect.

WHILE it is extremely difficult to forecast accurately what the incoming Congress may do, it seems a pretty good bet that voluntary allocations will be continued and standby allocation powers will be enacted to be used at the President's discretion. Standby price powers might be enacted, but would probably be used primarily as a deterrent rather than as a means to roll prices back. Consumer rationing is not in the cards, since it is patently unnecessary.

Meanwhile, the steel industry is in a position to get off on the right foot on any program of controls if it is willing to sacrifice some of its most competent key officials to administer such programs, rather than let a horde of bureaucratic grocery clerks fall heir to key positions by default.

Bureau of Mines Cites German Processes For Low Ash Coal Output

Washington

• • • **German processes** for producing coals of exceptionally low ash content suitable for the manufacture of high-grade electrode carbons are described in a Bureau of Mines publication as a part of the Bureau's coverage of foreign and domestic developments in coal technology.

The publication is one of a series of Bureau reports on wartime German developments in the mining, preparation and utilization of coal. It was prepared by H. G. Graham, Bureau mining engineer associated with the Synthesis Gas Production Laboratories at Morgantown, W. Va., and L. D. Schmidt, chief of the Bureau's Synthesis Gas Production Branch, also stationed at Morgantown.

A free copy of Information Circular 7481, "Methods of Producing Ultra-Clean-Coal for Electrode Carbon in Germany," may be obtained by writing to the Publications Section, Bureau of Mines, 4800 Forbes St., Pittsburgh 13, Pa.

Commodity Standards Div. Revises Band Saw Practice

Washington

• • • **Revision of** the Simplified Practice Recommendation for Metal-Cutting Band Saws has been approved, according to an announcement by the Commodity Standards Div. of the National Bureau of Standards. The revision will bear the serial number and title R214-48, Metal-Cutting Band Saws (Hard Edge, Flexible Back) and will be effective from Dec. 15, 1948.

The recommendation consists of a simplified list of stock types and sizes of hard edge, flexible back, metal-cutting band saws. Width thickness, and number of teeth per inch are listed for two types of saws, regular and skip-tooth. The recommendation includes size tolerances as well as general provisions covering type of tooth set, shape of teeth, width of set and hardness.

Until printed copies of R214-48 are available, mimeographed copies of the recommendation may be obtained without charge from the Commodity Standards Div., National Bureau of Standards, Washington 25, D. C.

THE BULL OF THE WOODS — BY J. R. WILLIAMS

KEEP IT UNDER YOUR HAT, DAVE, BUT OUR BID GOT THOSE TWO BIG NAVY YARD CRANES!
WHAT ARE THEY SKIPPIN' THAT ONE GUY FOR? GOIN' AROUND HIM LIKE A TOUCH-DOWN!
I GUESS IT'S BECAUSE HE CAN'T KEEP A SECRET VERY WELL!
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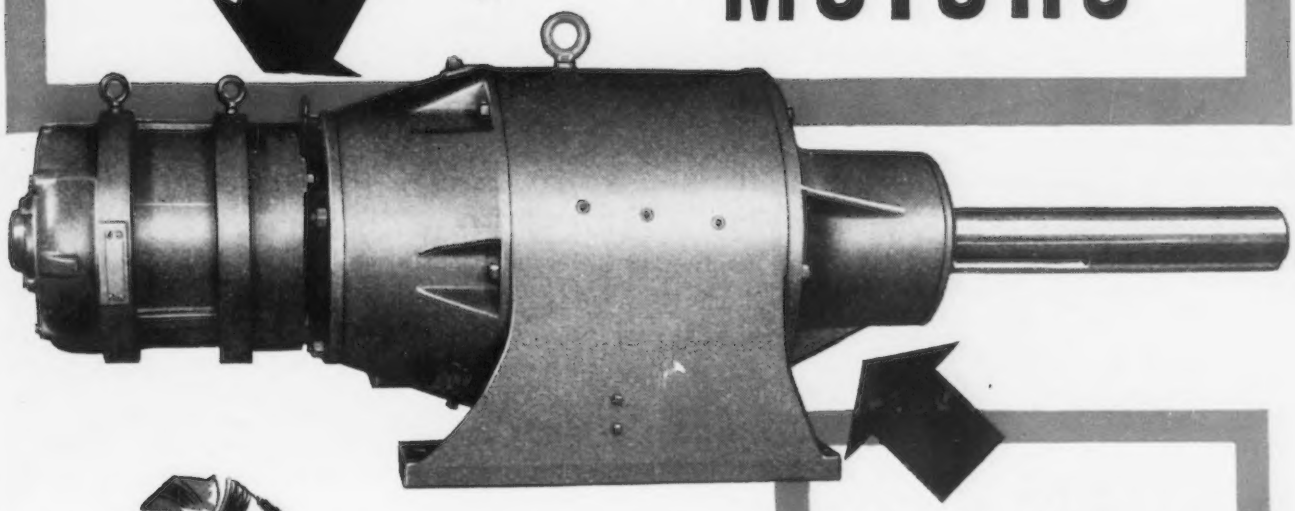

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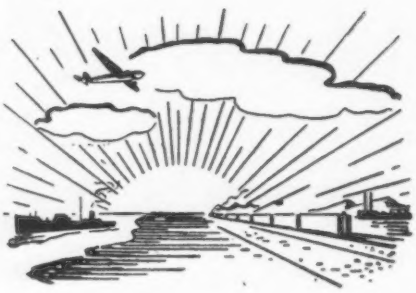
West Coast . . .

ROBERT T. REINHARDT

• Nonferrous mines and smelters, faced with high costs and operating difficulties, struggle along . . . But some are expanding operations.



SPOKANE—An accute shortage of nonferrous metals, and especially of the base metals, copper, lead and zinc—the principals of the nonferrous group and vital ingredients in everything from household items to heavy machinery—exerts a strong upward pressure on the inflationary spiral. War created shortages, the fear of a new war, reconstruction of foreign economies, and government stockpiling plans, lie at the heart of a demand estimated to be two or more years ahead of the supply.

Not so many years ago, any enterprising person with a pick and shovel could roam the West, locate an ore deposit, and open a mine for himself. Today there is still an abundance of undeveloped western ore resources, but any new development requires large investments in heavy tools plus expensive manpower and the price of a lease. The entire mining industry is agreed that there are insufficient incentives to create a favorable climate for venture capital in high cost mining. However, there are extremely heated controversies going on with regard to premium plans and subsidy payments for production and exploration, and the range of opinion runs from those who become violent at the least hint of government aid to those who sincerely and with equal ardor proclaim that price subsidy is the only solution.

Despite this lack of agreement on what shape the industry's future is to take; labor trouble; and the difficulty in furnishing suitable housing in isolated areas for the right kind of manpower; a number of important nonferrous metal developments are taking place in the western United States.

In the important copper, zinc and lead family, Kennecott Copper Corp. and U. S. Smelting, Refining & Mining have announced a major mining development which will permit Kennecott to extend its open pit operations in the Bingham, Utah area. Principal project will be the driving of a new 4-mile tunnel with the portal near Lark, several miles southwest of Bingham Canyon where the present Niagara Tunnel is located. Three years will be required to complete the project. The new tunnel, to be known as the Bingham Tunnel, will connect with U. S. Smelting's Niagara No. 2 shaft at the 1000 ft level, and with other workings where necessary to replace present handling facilities.

Contract for installation of lead equipment in Kennecott Copper Corp.'s new copper refinery at Garfield, Utah, has been let to Andrews-Knapp Construction Co., Inc., of New York City. Excavation for the new refinery, which will have an initial capacity of 12,000 tons per month, was started a month ago and construction work is scheduled to get underway in the near future.

The refinery, first in that area, is expected to stimulate establishment of copper-using industries there and on the Pacific Coast.

ANOTHER important construction project already begun is a new flotation plant at the Coronado Copper and Zinc Mine in the Shasta Copper Belt, from which the Bohemia mining district of Oregon will soon be shipping copper, lead, zinc and gold concentrates. The flotation mill at Champion mine is now being readied for production.

The Federal Bureau of Supplies expressed amazement recently on learning that, although consumers are desperately begging for zinc, western mining companies are having difficulty in marketing the ore they are producing. Frank Luedke of Spokane, president of the Highland-Surprise Mining Co., said recently: "If a man started producing zinc for the first time today, he wouldn't be able to market his product. The smelters can't handle any more zinc than they are smelting now." Smelters in Idaho, Montana, and British Columbia will no longer accept zinc from new companies.

The great electrolytic zinc plant of the Sullivan Mining Co. at Kellog, Idaho, now being enlarged with a $750,000 addition, is taking only a limited amount of ore produced from old mines in the Couer d'Alene district. Present capacity of the plant is 3500 tons a month. Even the enlarged plant, completion of which awaits delivery of a specially built motor generator set, will be unable to handle all the zinc now being mined in Idaho.

On Sept. 1, Metaline Mining & Leasing Co. assumed active management of the property of American Zinc, Lead & Smelting Co. at Metaline, Wash. More than a year's supply of zinc-lead ore is available for immediate mining, James L. Leonard, company engineer has announced. In the same area, Pend-Oreille Mines & Metals Co. has commenced preliminary work for the installation of its new mining and milling plant which will ultimately increase its capacity from 750 to 2000 tons daily. Completion of this work is anticipated by the end of 1948.

Pend-Oreille Mines & Metal Co. has obtained excellent results on zinc refining in vacuum furnaces at the former magnesium producing plant at Mead, Wash. according to Dr. Francis C. Cary of Wilmington, Del. The company, which operates a lead-zinc producer, also controls Reeves-MacDonald Mines Ltd., just across the Canadian border, which is expected to reach the production stage ahead of schedule by the end of this year.

A possible solution to the shortage of zinc refineries has been urged by northwest mine operators

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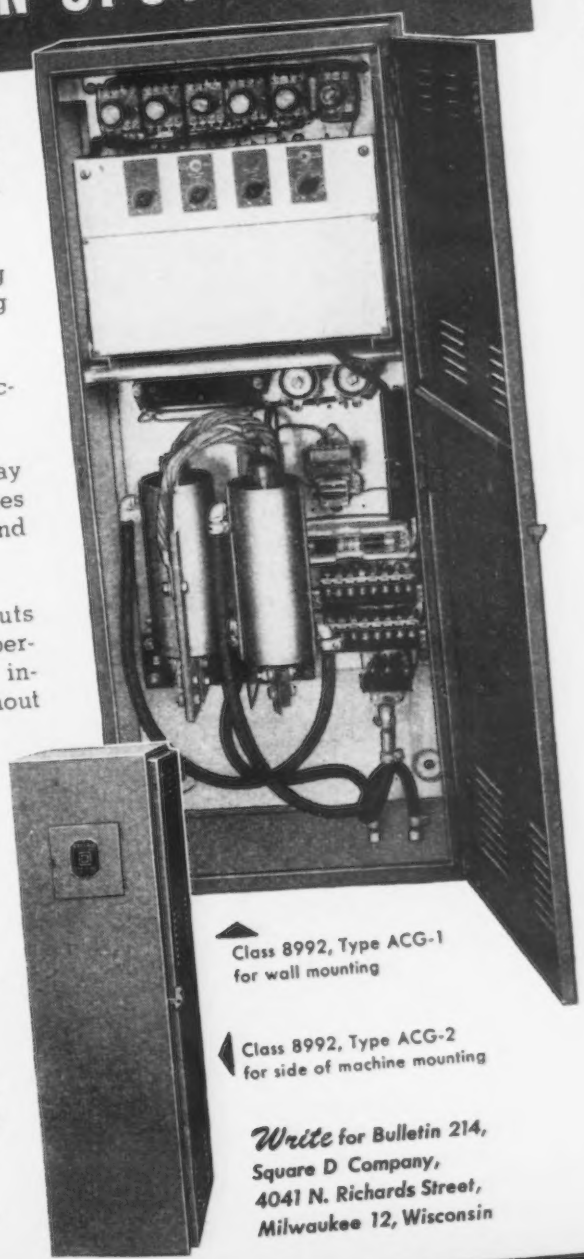

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on the return of United States mined zinc smelted in Canada. The huge smelter at Trail, British Columbia is nearer to northeastern Washington zinc mines than is any smelter in the United States. However, CIO unionists have fought the measure fiercely and have insisted that the processing of zinc be kept in the United States.

At Stibinite, Idaho, the Bradley Mining Co.'s $1,250,000 antimony-gold smelting plant is under construction, somewhat impeded by steel shortages. When completed the plant will be the only primary antimony smelter west of Texas. It will process only the output of the Yellowpine Mine at first, but by 1950 may accept jobs from other properties.

THE problem of obtaining chromium for government stockpiling and peacetime demands has been extremely critical, since manufacturers have attacked their postwar backlogs of product demand. Mines such as the Robertson chrome mine in Josephine County, Ore., the only chrome producing mine in the United States at this time, are finding that the margin between costs and market price is so narrow that development work is out of the question, and continued operation constantly threatened. On the other hand, several projected chromium operations have assumed major importance in the nonferrous world. American Chrome & Magnesium Industries, Inc., has signed a long-term lease with the Port of Anacortes, Wash. for a ship-harbor industrial site. The company is scheduled to construct chrome beneficiating and briquetting plants immediately. Chromium Mining & Smelting Co. has completed tests and is producing ferro-chrome-silicon in the electric arc furnaces formerly operated in connection with the plant at Mead, Wash., which during the war produced magnesium. The product is smelted from chrome ore shipped from New Caledonia, quartz mined from a quarry near Spokane, coal and coke.

James M. Orr and E. C. Boyd, Portland mining and chemical engineers, have leased the Harris sulphur grinding plant at Terminal #4 in Portland; drying facilities are being added and the plant is being altered to produce industrial minerals on a custom basis. Silver Gold Lode Mining Co. of Madison County, Mont. has adopted the bulldozer prospecting method recently, used with such success in the Coeur d'Alenes of Idaho. P. E. Oscarson, Spokane mining engineer and geologist, is directing the campaign which is watched with considerable interest by the U. S. Grant Mining Co. operating the adjacent Easton-Pacific and by a second concern, tentatively proposing to reopen the Mallette estate's High-Up Mine.

The results of all these new activities, whether already operating or projected, are a prospective solution to serious shortages; whether they will be sufficient remains to be seen. At least it is certain that, despite heavy equipment costs, labor difficulties, and fantastic production budgets, the nonferrous mining industry is aiming—with a fair degree of optimism—at much fuller production.

OUT OUR WAY: *Owens Corning Fiberglas Corp. is constructing a 350,000 sq ft warehouse and manufacturing plant at Santa Clara. More than 2000 tons of structural steel from Bethlehem Pacific Coast Steel Corp.'s Alameda works will eventually be used in building this structure which is currently more than 75 pct completed.*

Severance Tax Continues

Salt Lake City

• • • **Industry's hope** of stalling off a severance tax on natural resources for another 2 years was dimmed by the recent election, which returned control of both houses of the Utah legislature to the Democrats.

At the insistence of organized labor the party wrote into its state platform an indorsement of the severance tax principle, which will increase the already substantial pressures for such a revenue measure. In the past, a new severance tax has been opposed by both Republican and Democratic lawmakers on the grounds that it would discourage the state's budding industrial development. But the platform pledge plus the always present pressure for more revenues will be hard for Democratic members to resist when the 1949 session convenes in January.

Awarded Subcontract Work

Santa Monica, Calif.

• • • **Douglas Aircraft,** which is working on varied military orders at its El Segundo and Long Beach plants, announced that it has been awarded a Boeing subcontract for fuselage sections to be manufactured at its large Santa Monica plant where commercial orders are about completed.

The 16-ft sections of the fuselages are for the big B-50. The contract calls for 200 units at a cost of $3,500,000 and will extend through 1949.

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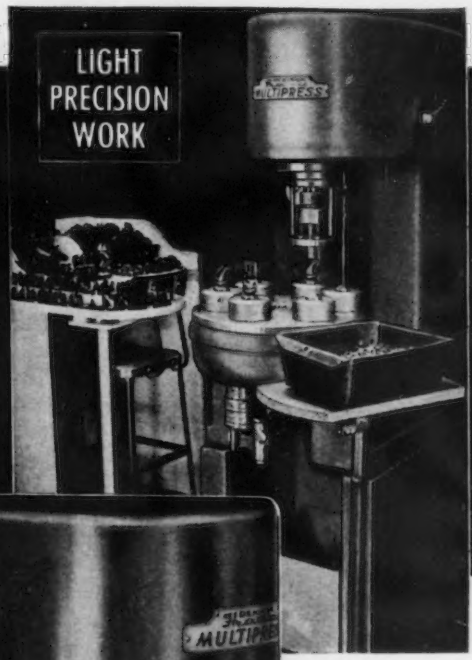
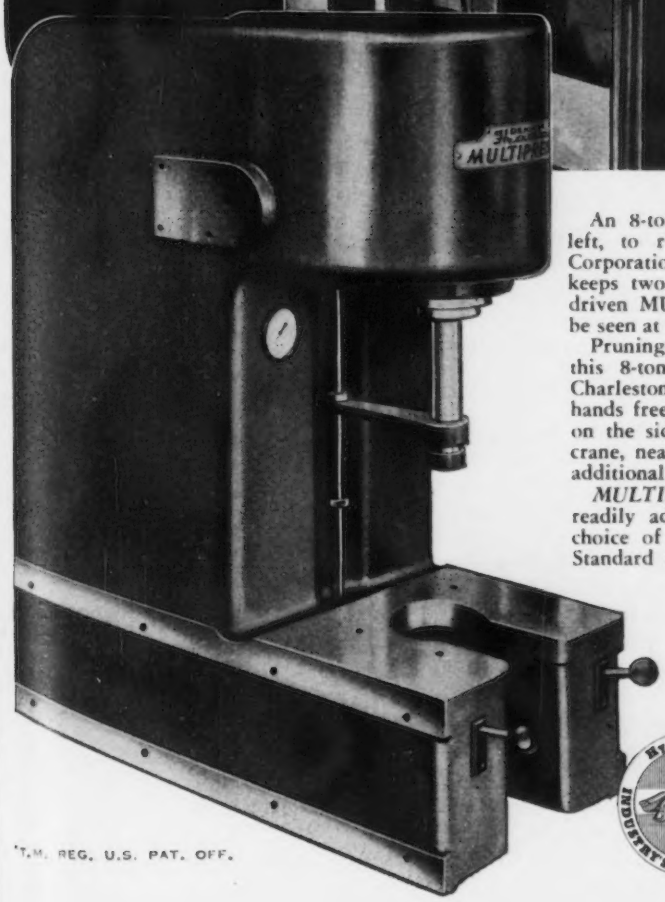
Return Speed	300 ipm





An 8-ton MULTIPRESS with automatic ram control is being used at left, to rivet an assembly of ball-bearing caster parts at the Colson Corporation, Elyria, Ohio. Handling up to 1250 units per hour, the press keeps two operators busy loading assemblies onto the synchronized, oil-driven MULTIPRESS indexing table, from a conveyor system which can be seen at the left.

Pruning-shear forgings are trimmed rapidly under high pressure by this 8-ton MULTIPRESS at The American Fork and Hoe Company, Charleston, W. Va. Foot-pedal control of the ram leaves the operator's hands free for efficient handling of the forgings. Note the hooks mounted on the side of this Multipress to facilitate moving the unit, by overhead crane, near forge hammers at other points in the plant, where it handles additional trimming work. A heavy-duty job for a small press!

MULTIPRESS is a high-speed, high precision oil-hydraulic tool — readily adaptable to an amazing range of jobs. Available with a wide choice of manual and automatic controls of tonnage, speed and cycling. Standard accessories include benches, side shelves, work-table extensions, bolster plates, special toolings, indexing and dial-feed tables, and attachments for pelleting, foil-marking and other operations. Also in 4, 6, and 25-ton capacities — *plus the famous new one-ton MULTIPRESS Midget!* Write for details today!

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PERSONALS

HOWARD M. DAWSON, president, Jessop Steel International Corp.

• **Howard M. Dawson** has been elected president of Jessop Steel International Corp., New York. Mr. Dawson had formerly served as vice-president and managing director of the corporation. Jessop Steel International is a wholly-owned subsidiary of Jessop Steel Co., Washington, Pa.

• **Nelson C. Walker** has recently been appointed assistant district manager of American Car & Foundry Co.'s Berwick, Pa., plant. Mr. Walker had been vice-president and general manager and later president of the United Tank Corp., which post he held prior to joining ACF.

• **John W. Humphrey**, executive vice-president of the Philip Carey Mfg. Co., and **Thomas C. Haydock** of Haydock & Co., have been elected to the board of directors of Crosley Motors, Inc., Cincinnati.

• **Charles I. Haslup** has been appointed sales manager of field operations for the Reading-Pratt & Cady division of American Chain & Cable Co., Inc. Mr. Haslup has his headquarters in Reading, Pa.

• **J. O. Cross** has been named director of industrial relations for U. S. Radiator Corp., Detroit. Mr. Cross formerly served as personnel manager for the Kaiser-Frazer Corp., Willow Run, Mich.

o o o

• **W. J. Graham** has been appointed manager of sales of the forging and casting division of Allegheny Ludlum Steel Corp. at Ferndale, Mich. Mr. Graham joined the corporation as sales engineer in 1930 and has served in that capacity until his new appointment.

• **George F. Bateson, Jr.,** has been named assistant manager of the warehouse division of Republic Steel Corp., Cleveland, assisting in the management of the 24 fabricated product warehouses which Republic and Truscon Steel Co. operate throughout the country. Prior to his new position, Mr. Bateson served as sales manager of Truscon in Charleston, W. Va.

• **Carl L. Radway** has been named division superintendent, cold rolling mills, Cuyahoga Works, American Steel & Wire Co., Cleveland.

• **Fred S. Ehrman,** general sales manager of Bowser, Inc., Fort Wayne, Ind., has been elected to the newly-created post of vice-president and director of sales. Mr. Ehrman has been associated with Bowser since 1925 and has served successively in experimental engineering, sales engineering and divisional sales work.

• **W. J. McNeill** has been appointed assistant to the president, and **E. J. Stockum,** vice-president, has been named general manager of the G.H.R. Div., Dayton Malleable Iron Co., Dayton.

• **Herbert E. Johnson** has been named superintendent of transportation and labor for the Youngstown district of Youngstown Sheet & Tube Co. Mr. Johnson joined the company in 1944 as superintendent of transportation and labor at its Brier Hill works and held that position until his recent appointment.

• **G. B. Davis** has been promoted from assistant sales manager to sales manager, Baker-Raulang Co., Cleveland. Mr. Davis joined the company in 1935 and the sales staff of the Baker Industrial Truck division two years later.

JOHN A. PROVEN, general sales manager, Porter-Cable Machine Co.

• **John A. Proven** has been named general sales manager of the Porter-Cable Machine Co., Syracuse, N. Y., also directing the sales efforts of the Unit Electric Tool Co., a division of Porter-Cable. He had formerly held the position of vice-president and sales manager of Sterling Tool Products Co., Chicago.

• **John C. Kuhn** has been advanced from sales manager to vice-president and director of sales, Morse Twist Drill & Machine Co., New Bedford, Mass. **Stanley B. Lindh,** recently engaged in the paint industry in Boston, has been named to the newly-created post of sales promotion manager.

• **Norman J. Kilmer** has been named sales representative for Ohio Electric Mfg. Co., Cleveland, in the Pittsburgh and Wheeling area. Mr. Kilmer's headquarters are located in Pittsburgh.

• **James C. Plunkett** has been named assistant advertising manager of the Columbia Chemical Div., Pittsburgh Plate Glass Co., Pittsburgh.

• **Gordon P. Lovell** has been appointed sales manager of the electric accounting machine division, International Business Machines Corp., New York. Mr. Lovell joined IBM in 1932 and has served in various sales and executive capacities.

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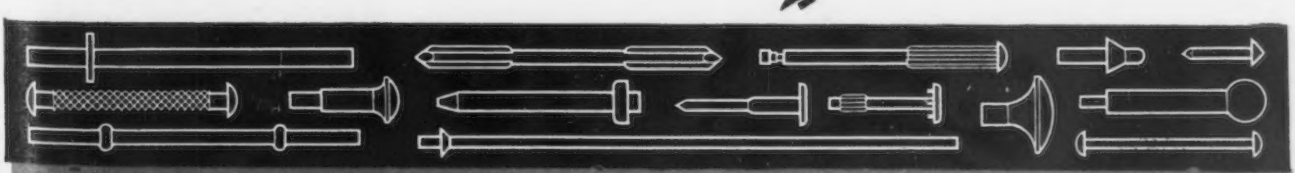

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J. E. NIEDERHAUSER, vice-president in charge of industrial relations, Continental Can Co.

• **J. E. Niederhauser,** formerly manager of industrial relations, Continental Can Co., New York, has been elevated to the newly-created post of vice-president in charge of industrial relations.

• **Thomas B. Moule,** formerly assistant director of sales, has been appointed sales manager of the Plomb Tool Co., Los Angeles. Mr. Moule joined the company in 1944 and has supervised many important sales and merchandising activities.

• **William W. Eaton** has joined the Central Research Organization of Olin Industries, Inc., East Alton, Ill. Dr. Eaton had formerly been associated with the Photorecords division of Remington Rand. He has served as assistant plant manager of the Naval Ordnance Plant in Camden, Ark., and as development engineer for Eastman Kodak Co. Dr. Eaton has his headquarters in New Haven, Conn.

• **James D. Allan,** former manager of the Pratt & Whitney Cleveland Office, has been transferred to West Hartford, Conn., and appointed manager of domestic machine tool sales. **Frank W. Schreiner** has been appointed Cleveland sales manager. He entered the employ of the company in 1926 and has been a member of the Cleveland sales staff for 21 years.

• **Richard H. Lamont, Charles C. Northrup** and **Collins Boyce** have been assigned to the Eastern Ohio, Pittsburgh and Buffalo-Erie area, respectively, as salesmen for the A. B. Murray Co., Inc., with headquarters at the firm's McKeesport, Pa. warehouse office.

• **Joseph S. Sherer, Jr.,** formerly vice-president and assistant general manager of Reo Motors, Inc., has been elected president and general manager succeeding **Henry E. Hund,** who has been named chairman of the board. **James J. Dervin,** formerly vice-president and director of purchases, succeeds Mr. Sherer as vice-president and asistant general manager.

• **Malcolm C. Reed** has been elected vice-president in charge of sales, Dunkirk Radiator Corp., Dunkirk, N. Y., succeeding **Carl A. Sawade** who has been made head of the company's general sales offices in New York. **Robert E. Reed,** formerly assistant superintendent has been named secretary to succeed his brother and **Joseph N. Vandervoort** has been appointed purchasing agent.

• **John P. Dearasaugh** has been appointed head of the Aluminum Co. of America's gas properties in Texas, with headquarters at the new Alcoa reduction works now under construction at Point Comfort. The service inspection activities of the Castings Div., formerly handled by Mr. Dearasaugh, have been combined with the customer service activities of the Fabricating Div., under the direction of **John W. Hood** of the central metallurgical department, Pittsburgh office.

• **Hyman Iserson** and **Maurice E. Miville** have been named research chemists at the Whitemarsh research laboratories of Pennsylvania Salt Mfg. Co., Philadelphia. Mr. Iserson formerly worked as a research chemist for Frankford Arsenal and Rohm & Haas. Mr. Miville had formerly been associated with the Celanese Corp. of America.

• **H. S. Klingenstein,** who recently resigned as executive vice-president and director of Duquesne Smelting Corp., has become affiliated with Keystone Metal Co., Pittsburgh.

• **H. W. Knight** has been elected to the board of directors of American Zinc, Lead & Smelting Co., St. Louis.

• **Arthur R. Collins** has been appointed general manager of Division III, the "South Wind" heating equipment division of Stewart-Warner Corp. at Indianapolis. Mr. Collins joined the division in 1942 and has headed manufacturing and engineering activities. **E. G. Fossum** has been appointed assistant to the president of the corporation. Mr. Fossum has been a member of the organization since 1926.

• **L. G. Maechtlen** has been named general sales manager of the Square D Co., Western Div., Los Angeles. Mr. Maechtlen has served as works manager of the Valley Boulevard plant.

• **B. A. LeMonte,** formerly assistant roll engineer, Jones & Laughlin Steel Corp. Pittsburgh, has been appointed roll engineer, succeeding **Norman C. Rendleman,** who has retired after 44 years with the company. Mr. LeMonte joined J&L in 1925.

B. A. LEMONTE, roll engineer, Jones & Laughlin Steel Corp.

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• **Thomas R. Martin** has been appointed chief design engineer for Corporacion de Fomento de la Produccion (Chile). Mr. Martin had formerly been connected with National Tube Co., Republic Steel Corp. and Marion Power Shovel Co. At present Mr. Martin is located in the New York office of the company. He leaves for Chile shortly after the first of the year.

• **R. C. Brown** has been appointed sales director for Foote Bros. Gear & Machine Corp., Chicago. Mr. Brown formerly served as southwest division manager for Link Belt Co. and more recently, and until joining Foote Bros., he served as president of the Brown-Steele Co., Dallas.

• **E. S. Sensenderfer** has been named advertising manager of Bonney Forge & Tool Works, Allentown, Pa. Previous to his connection with Bonney Forge, Mr. Sensenderfer had been associated with Foltz-Wessinger Inc., with the U. S. Asbestos division of Raybestos-Manhattan, Inc. and American Trucking Associations, Inc.

• **William J. Hall** has been appointed production manager of the Ivanhoe Div., Reliance Electric & Engineering Co., Cleveland. Mr. Hall joined Reliance in 1935 as a dispatcher in the production department. He has been night superintendent of the Ivanhoe division for the past two years.

WILLIAM J. HALL, production manager, Ivanhoe Div., Reliance Electric & Engineering Co.

• **Russell D. Ryker** has been promoted to assistant manager of quality control and **Louis J. Burkhart** has been appointed chief inspector for Bendix Home Appliances Inc., South Bend, Ind. Mr. Ryker has been in the quality control division since 1943. Mr. Burkhart formerly had been employed by Ingersoll Steel division of the Borg-Warner Corp.

• **J. I. Onarheim** and **R. T. Ward** have been assigned to the Milwaukee district office of Allis-Chalmers Mfg. Co. Mr. Onarheim has been a member of the company's central station and marine sales department for the last 18 months. Mr. Ward has been employed in the administrative office of the executive vice-president of the general machinery division for the past four years. **Jay Seefeld,** who formerly served the Tennessee Eastman Corp. at Oak Ridge for two years, has been named to the San Antonio office of Allis-Chalmers. **W. H. Sanford** has been assigned to the Houston district office. He had formerly been associated with Fort Worth Steel & Machinery Co. **A. Joseph Mestier, Jr.** joins the New York district office as petroleum sales representative. Mr. Mestier became associated with the company in 1946. **Robert E. Bender** has been assigned to the Grand Rapids branch office.

• **Frank L. Johnson** has been appointed division sales manager of the Osgood Co. and General Excavator Co., both of Marion, Ohio, covering the states of Washington, Oregon, California, Nevada and parts of Montana and Idaho, with his headquarters in San Francisco. Mr. Johnson had formerly been associated with American Wheelabrator & Equipment Corp.

• **Carl Eversole** has been appointed to the advertising agency staff of Charles F. Dowd, Inc., Toledo. For the past seven years Mr. Eversole had charge of industrial division advertising and publicity at Surface Combustion Corp.

• **Marcus Thau** has been named director of research, development and production, Metric Lacquer Mfg. Co. Inc., Irvington, N. J. Dr. Thau had previously been associated in a similar capacity with Lacquer & Chemical Corp.

RUSSELL MASSEY, superintendent of rolling mills, Atlas Steels Ltd.

• **Russell Massey** has been appointed superintendent of rolling mills, Atlas Steels Ltd., Welland, Canada. He joined the Atlas organization in 1941 as supervisor of the 26-in. and 22-in. mills, a position he has held since that time. Mr. Massey entered the steel business in 1932 with Weirton Steel Co.

OBITUARY...

• **Thomas R. Mullen, Jr.,** 28, vice-president, Lehigh Structural Steel Co. and Lehigh Construction Co., New York, died Nov. 16.

• **William S. Rogers,** 60, former president of Rogers, Brown Iron Co., now the Susquehanna plant of Hanna Furnace Corp., Buffalo, died Nov. 6.

• **John M. Prowell,** 58, president and owner of Avondale Stove & Foundry Co., Birmingham, died Nov. 10.

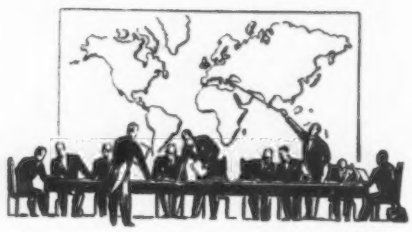
• **J. Henry Drury,** 86, founder and former treasurer of Union Twist Drill Co., Athol, Mass., died Nov. 6.

• **James D. Jones,** 67, vice-president in charge of engineering, H. A. Brassert & Co., New York, died Nov. 7.

• **Roger E. Hopps,** 50, director of purchases for GMC Truck and Coach Div. of General Motors Corp., Detroit, died Nov. 2.

European Letter . . .

• Success of ERP depends on Western Europe's ability to restore its own agricultural productivity . . . East and West patterns differ widely . . . Essential trade between the two must be revived.



LONDON—Western Europe depends largely on its own agricultural production. Even before the war imported food supplies accounted for only one-fifth of annual requirements at the most; if the United Kingdom were excluded, the proportion imported would be much smaller. Since the war, however, agricultural production in western Europe has been lower than it used to be. For the crop year 1946-47 it was estimated at only 75 pct of the 1934-38 level. Imports, moreover, have been restricted by payments difficulties. In all, consumption measured in terms of calories has been reckoned to be some 20 pct below the prewar standard. In the first two years after the war some relief was afforded by UNRA shipments; latterly it has been afforded by Marshall aid. But although the Marshall Plan provides for some expansion of food imports, the success of the recovery program in food depends on western Europe's ability to resuscitate its own agriculture.

The agricultural patterns of western and eastern Europe differ widely. In the west, agriculture takes second place to industry, but it is more highly capitalized, with a higher productivity per man and per acre than in the east. It specializes more on livestock products; it requires fertilizers and imported feedingstuffs in large quantities. In eastern Europe, it tends to be more primitive and is concentrated largely on grain production. If this pattern is to persist, it will be essential to revive trade between eastern and western Europe. Before the war, there were two dominant movements in the European trade in foodstuffs; first, the large scale shipment of wheat and other cereals from eastern Europe to the West and, second, the shipment of livestock products and fresh fruit and vegetables mainly from western Europe to Britain. The plan for European recovery assumes that both these prewar characteristics will be restored.

IN 1946-47, the acreage devoted to the main agricultural crops in western Europe was 8 pct lower than before the war, except for coarse grains, where the acreage was slightly larger than in 1934-38. The output of these crops, however, apart from sugar, was fully 10 pct below that of the prewar period, and the same was true of the livestock population. The numbers of cattle had regained their 1934-38 average, though those of sheep and pigs were 5 pct and 37 pct smaller, respectively. Output of milk products was down by 30 pct and of meat by 34 pct. The same trend was also evident in poultry; flocks were reduced by 20 pct while egg production was 34 pct smaller. These figures give some impression of the serious fall in agricultural productivity in Europe. Fertilizers were scarce during the war and soil fertility was seriously depleted. Farm equipment was worn out or destroyed. Labor in the occupied countries was drafted to Germany. Supplies of concentrated feedingstuffs for the livestock production were no longer available. Modern agriculture also depends on a host of other specialized materials such as improved seeds and insecticides, which were equally in short supply. This legacy of the war years had to be made good.

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BUT the production cycle in agriculture is lengthy; the simplest plans may take two or three years to materialize. For livestock they take even longer. If at the end of hostilities there had been an abundance of fertilizers, farm equipment and feedingstuffs, and if agricultural laborers had returned to their former occupation, recovery to the prewar level of output would still have taken at least three years. But, instead of abundance, there were shortages. Some improvement was achieved in agricultural production in 1946, but matters were made worse again by the severe winter of 1946-47 and the summer drought which followed, causing output in 1947 to fall sharply. A serious reduction in yields of arable crops has been made good this year. But the shortage of feed for livestock caused a reduction in numbers of cattle and sheep, so that recovery was postponed by at least two years.

Although total agricultural production in western Europe may, perhaps, regain its prewar level by 1950-51, the pattern of trade in foodstuffs between the participating countries will alter appreciably. The United Kingdom expects to be less dependent on imported foods, particularly those at present obtained from the Western Hemisphere. Cereal and potato production, which was expanded considerably during the war years, will be reduced in favor of livestock production, but the level aimed at will still be 10 to 20 pct above prewar. With livestock, the emphasis will be on milk rather than meat. Both Denmark and the Netherlands expect to resume their prewar exports of meat and dairy products, still mainly based on imported foodstuffs; the Netherlands, however, intends to switch from the export of butter to the export of cheese and processed milk. Norway and Sweden intend to expand agricultural production for their domestic markets without attempting to recapture their prewar export trade which was largely focused upon the British market, whereas France plans to expand output from a smaller cultivated area. Such are the plans. Whether they are mutually compatible remains to be seen.

YET these plans, which form the basis of the European Recovery Program, are dependent for their fulfilment on certain assump-

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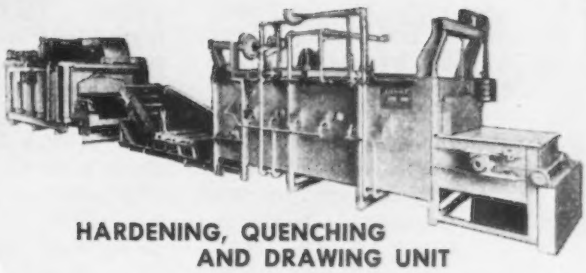

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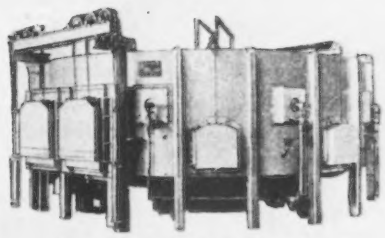

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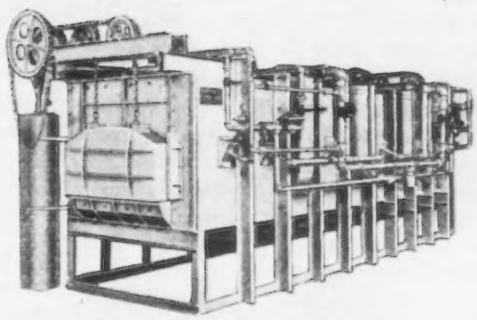

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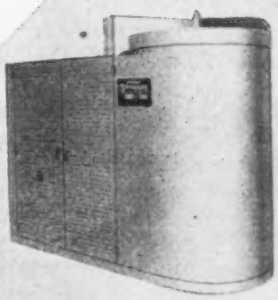
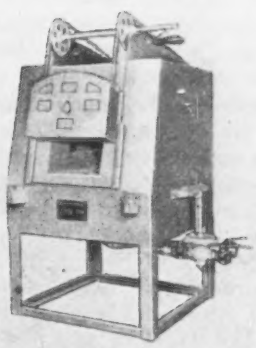


RECIRCULATING FURNACES



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tions. In the first place, they presuppose an adequate supply of agricultural raw materials—fertilizers, equipment, feedingstuffs, insecticides and seeds. Secondly, they presume the maintenance of East-West trade in Europe. Thirdly, they envisage development of agricultural production in colonial areas. These latter projects, so far as the United Kingdom is concerned, are well behind schedule, so that to this extent the targets laid down in the European plan may not be achieved. East-West trade is likely to continue in spite of the apparent worsening of political relations. Southeast Europe will still want to dispose of its grain surplus to western Europe in return for industrial equipment. Nevertheless, in the longer term, this basic assumption of East-West trade may be open to question, because the splitting up of large estates and the development of industrialization in these countries is likely to change their agriculture towards mixed farming and livestock and away from cereal production. Major changes of this kind might mean the destruction of the very basis of East-West trade in foodstuffs.

The most important assumption of immediate concern is the availability of fertilizers, farm equipment and feedingstuffs. Before the war, western Europe was a net exporter of nitrogen and potash but an importer of phosphates; in 1946, however, it was a net importer of nitrogen. The bulk of plant nutrients is obtained from farmyard manure and this source has been affected by the decline in livestock numbers. Consumption of commercial fertilizers at present is probably at the prewar level, but Europe, nevertheless, plans almost to double its output of fertilizers by 1950-51 and most of that will be consumed domestically. But the future level of fertilizer production depends on industrial plant, coal and electricity, and it is doubtful whether production can be increased at the anticipated rate. Europe is not short of phosphate; the small import requirement is due to the relatively restricted capacity to manufacture superphosphate—the raw material, phosphate rock, is in plentiful supply and readily available in North Africa. Western Europe, however, is not so well supplied with potash. The only important sources are France and western Germany, but the latter's output is used entirely for its own needs. Imports could be obtained from eastern Europe (in particular the Soviet zone of Germany), Spain and Palestine provided that trade is maintained with these countries.

No less important than fertilizers is the supply of agricultural machinery. There has already been a marked expansion in the mechanization of Western European agriculture, but requirements of tractors are expected to be three times their prewar level by 1951. If the plans materialize, western Europe will have a sizeable export surplus of tractors—although it will still be necessary to import small quantities of heavy tractors—while import requirements of other machinery in 1950-51 are estimated at 543,000 tons compared with an export surplus of 390,000 tons. Britain must be the mainstay of this increase in production of agricultural equipment. It has already achieved a remarkable rate of increase in production of tractors and agricultural machinery, and exports have been maintained at a high level. But the future plans depend largely on sufficient steel. If supplies of steel for farm equipment were curtailed, the future of Europe's agricultural recovery would be in jeopardy. Criticism has already come from the United States that the projected increase in mechanization is too great.

BUT given the present scarcity of agricultural labor in all countries of western Europe except Italy, increased supplies of agricultural machinery are essential to raise agricultural productivity and to replace the loss of draught animals since 1939.

Western Europe's agricultural recovery program depends on increased livestock production. Hence it requires an expansion in the supply of feedingstuffs and, in particular, of concentrated feeds. The Food and Agriculture Organization has recently estimated that in 1946-47 the supply of concentrates in the principal countries of western Europe was less than two thirds of the prewar level, and that the supply of all feeds was 85 pct. The shortage of bread grains, the higher extraction rate in flour milling, and the use of certain coarse grains for human consumption have led to a further shortage in the supply of feedingstuffs. During the current season there will certainly be a sufficiency of bread grains and coarse grains. But this improvement is likely to benefit only egg and pork production. Cattle and sheep are more dependent on oil-cakes, and not even the most optimistic estimates expect the world supply of oils and fats to regain its prewar level before 1951, if then. There has, of course, been considerable development in improving grasslands, grass drying and silage which has helped to increase indigenous supplies of animal food. Nevertheless, farmers will have to be assured of a more enduring increase in the supply of feedingstuffs before they can be encouraged to expand their livestock herds to the required extent.

This year's favorable crops, therefore will increase the amount of food available for human consumption in western Europe. But they are unlikely to contribute directly to agricultural recovery. There is always scope for better farming methods, better seeds, and other technical improvements, but basically agricultural recovery depends on an expansion in industrial output. This relationship is very close. It implies that agriculture must be assured of increased supplies of fertilizers and farm equipment; it also implies an expansion in consumer goods and a general improvement in the economic health of western Europe. It is one thing to expand agricultural production; it is another to ensure an efficient distribution of the goods produced. Ration schemes and governmental regulations help, but the only certain method of securing a proper distribution is by making it profitable for farmers to exchange their produce for the goods they want.

Approves French Funds

Washington

• • • **Use of nearly** 8 billion francs from the French counterpart funds for mining reclamation and improvement has been approved by the Economic Cooperation Administration.

About a third of the total will be used for purchase of new plant equipment, divided equally between pit and surface mines. Also, nearly 1.9 billion from the fund will be expended on mining power projects.

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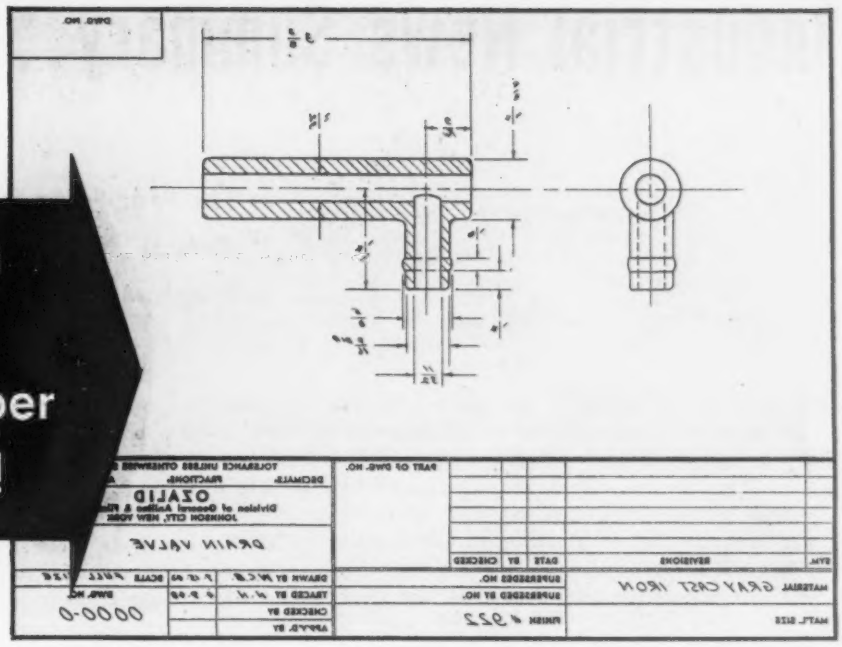

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This New Ozalith Paper Costs Little—Has Great Mechanical Strength—Washable, Plastic Surface!

If your operation demands the duplication of a large bulk of drawings and plans, this new Ozalith Intermediate Paper should be of great interest to you.

For it is the answer to the need for a reasonably priced (7½¢ per square foot) paper duplicate original having maximum possible toughness of base; permanence, for filing and record use; and highest reprint quality. It reprints at exceptionally high machine speed.

No Tendency To "Bleed"

The dye image will not offset or transfer to other papers or tracings with which this new Ozalith paper has been placed in contact. There is no tendency to "bleed."

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You can wash Ozalith with a damp cloth—dust, dirt, and grease will come off quickly. Water will not cause the base to cockle or the image to run.

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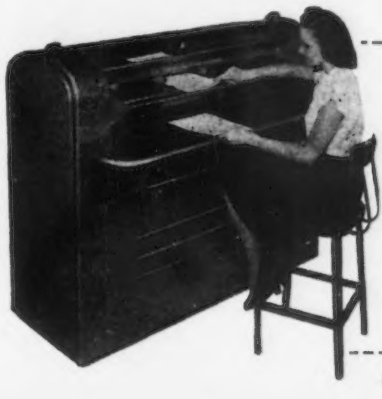

DEPT. NO. 212

OZALID . . . A Division of General Aniline & Film Corp., Johnson City, New York

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Ozalid in Canada—Hughes Owens Co., Ltd., Montreal

Industrial News Summary...

- **The Word Capacity Is Overrated**
- **Actual Production Tells Story**
- **Steel and Power Neck and Neck**

THE word capacity has been highly overrated. What it means lots of times depends on who is using it. It has caused the steel industry no end of trouble. It has furnished some government high binders ammunition for any and all purposes. But mere capacity figures alone mean nothing unless "what we have is used."

Production is the real story. It has been hampered in the steel industry during the past 3 years by strikes, labor shortages, iron shortages, coal shortages, scrap shortages, occasional leadership shortages and what all. Slowly the industry has caught up with each of these blocks standing in the way of full production. Whether it can continue at the present high rate and not be subject to serious spot emergencies is hard to tell.

But steel is now being turned out at a rate which ought to go a long way next year toward taking steel people off a perennial barbecue spit. At least this is what sales people hope for, pray for and live for. Three years of needling has been almost too much for present heads in the industry.

A major hurdle steel has faced has been electric power. Thanks to some outlandish gyrating in changing schedules, plants, product-mix and a few other things, power shortage has not yet seriously cut steel fabrication or output. But it has been—and is—a headache.

The power shortage in steel is like the steel shortage. More is being produced than ever before but not enough to satisfy all consumers in the steel and fabricating groups. The power shortage in steel has been spotty. It is a geographical problem and at times a paradox.

In the Pittsburgh district power has been a short item with steel mills. But close to that center power is no problem. Two Navy-owned steel furnaces, idle since the war, were down because there was not enough power—in that location—to run them. They have been moved. Not far from where they were. And they are now a factor in higher steel output.

SHEER ingenuity and cooperation have prevented the nationwide power shortage from interfering seriously with steel production and fabrication as it has seriously cut into aluminum production. Three areas that can't always meet peak demand are Pittsburgh, Cleveland and Chicago.

In Cleveland a rationing program is in effect to cut industrial power consumption at peak hours. Parts of Pittsburgh will come under a similar plan the first of December. It has worked quite well in Cleveland because industry there has been able to figure out ways of shifting power loads to off-peak hours. Steel mills, for instance, try to schedule their operations so that the big mills are down for roll changes during the top-demand hours.

Some electric furnace production was lost in the Pittsburgh area last winter when the power companies there were forced to call upon their electric furnace customers to cut operations on short notice. It was possible to avoid spoiling any heats but some were delayed.

Because of the difficulty of rescheduling a few finishing mills now running a full three turns a day, it is likely that a little finished steel may be lost in the Pittsburgh district because of next winter's power cuts. However, the probability of curtailments due to natural gas shortages are going to make it hard to tell what caused what losses. Some stockpiling of semi-finished steel appears possible. If so, it will be on a limited scale and is expected to build up stockpiles behind the mills to the point where steel mill operating men would like to have them for efficient operation.

The probability of more than 92 million tons of steel ingots being turned out next year—barring strikes—is not much help to steel consumers today. But it may be the answer to a lot of steel shortage questions today. One thing seems certain; if steel is as short by the end of 1949 as it is now there will be more fireworks over the capacity problem than the industry has seen yet.

Steel output this week stays at 99.5 pct of capacity. Mild weather in the Middle West and East can be given a lot of credit for top level output.

BEHIND the steel shortage is a critical pig iron supply picture that gets no better. Conversion deals are often supported by a supply of a pig iron obtained after long arduous planning. But just as often after the pig iron is found for the steel, another shortage shows up in ingot molds. Tight pig iron supplies have mold makers frantic at times. The steel is often in sight with no molds to pour it in. So it goes. If several links in the steel supply picture ever break down at one time it would be bad—for supplier and customer.

Aluminum producers, hard pressed by domestic demand and stymied by power shortages, are aghast at the large tonnages of foreign aluminum and aluminum scrap coming into this country from Marshall Plan nations. What burns them up is that the imports are made possible by ECA shipments of Canadian aluminum at prevailing prices paid for in American dollars. The imports are sold to consumers here at gray market prices ranging from 50 to 70 pct above the domestic level.

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• **GALVANIZED EXTRAS JUMP**—Because extras based on zinc prices above 15c per lb are not printed, the following Carnegie-Illinois Steel Corp. extras are listed, based on Prime Western zinc at 17½c per lb. Galvanized flat sheet, **gages: 9 to 14,** 33c; **15 to 23,** 65c; **24 to 27,** 98c; 28 to **32,** $1.39. Galvanized flat sheet, heavy coatings, add 260 pct to extra for coating stipulated. Culvert sheet, 2 oz triple spot test, add 78c to gage price. Roofing and siding quality, extras per square, **gages: 24 to 29,** $1.03; **22,** $1.17; **18 to 20,** $1.30; **16,** $1.88. Major pipe producers have generally added $4 a ton to galvanized pipe and tubing prices, reflecting the recent zinc price boost.

• **EXTRA DIVIDENDS**—National Steel Corp. declared its usual third quarter dividend of $1 a share plus a year-end extra dividend of $1 a share. In addition, the company which operates Weirton Steel Co., Great Lakes Steel Corp., Hanna Furnace Corp. and Hanna Iron Ore Co. declared a 10 pct stock dividend.

• **BASING POINT CHANGE**—There is one, but not in the United States at this time. Algoma Steel Corp. has changed its basing point for pig iron prices from Montreal and Toronto to Sault Ste. Marie, Ont. Under this new price ruling consumers are faced with the freight charges which would bring the price to Montreal and Toronto melters approximately $5 per ton above previous levels.

• **ARMCO SHEET BOOST**—Armco Steel Corp. has raised the price of its cold rolled electrical sheet in the Tranco grades by $20 per ton.

• **ORE MORE ORE**—Reflecting new blast furnace capacity, consumption of Lake Superior iron ore by U. S. and Canadian blast furnaces soared to 7,398,055 gross tons in October. This is the highest monthly consumption this year. It raises the 1948 cumulative consumption to 66,220,148 gross tons, according to the Lake Superior iron ore association's monthly report. On the basis of these figures it is estimated that Lake Superior ore consumption this year will be about 81 million tons. Also it is expected that total ore consumption this year will run to 98 million gross tons or more.

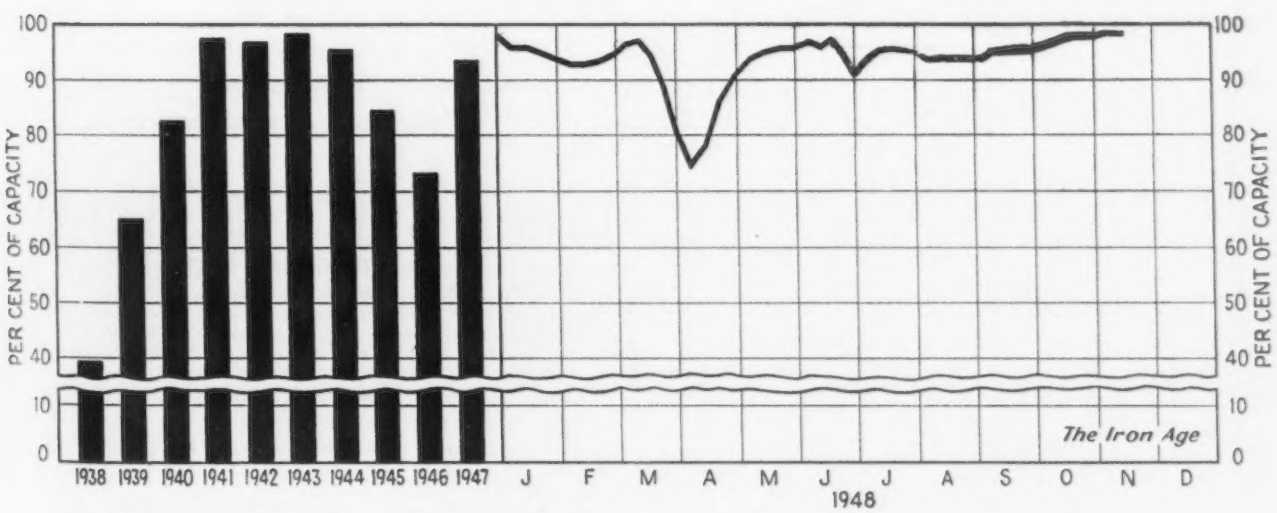
• **REPUBLIC EXTRAS**—Republic Steel Corp. has made a readjustment of size and processing extras on hot rolled sheet and strip and processing extras on cold rolled sheet and strip because of increased manufacturing costs. In some cases these are the first adjustments on these charges to be made in 15 years. Hot rolled processing extras have been increased from 0.1c to 0.25c per lb on sheet and strip. Size extras on hot rolled sheet are up about 0.15c and strip slightly over 0.5c per lb. Increases in processing extras on cold rolled sheet and strip vary between 0.1c and 0.25c per lb.

• **KAISER'S INTEGRATION**—Kaiser-Frazer has dug deep for $3.6 million for an important buy to them—the Phoenix-Apollo Steel Co. at Phoenixville, Pa. This purchase is another move by Kaiser in its constant effort to get enough steel for its automobile manufacturing operations. The purchase includes 6 openhearths, a blooming mill, 2 finishing mills and a structural mill which in all produces about 26,000 tons of steel products monthly. A new corporation will be formed to operate the plant, but present management will retain supervision. David Thompson who is now president of Phoenix-Apollo will be the head of the new company when Kaiser-Frazer takes over on Dec. 31.

• **GRANITE CITY SHEET UP**—Granite City Steel Co., Granite City, Ill., has raised the base price of cold rolled sheet $10 a net ton effective Nov. 16. No adjustment in extras was made. This now makes the base price for this mill $4.70 per 100 lb.

• **ON YOUR OWN**—Purchases of German iron and steel scrap will have to be undertaken by U. S. firms on an individual basis, the Commerce Dept. decided this week. Secretary Sawyer, in announcing the government's decision, said that the proposal to set up a government scrap-buying corporation were not without merit. But uncertainties have developed, he said, as to the extent to which the military government in Germany could participate in a pooling arrangement. Furthermore, he added, the Justice Dept. has raised the question of possible antitrust law violation. Sawyer said he hoped that under the individual buying agreements which now have the green light, substantial quantities of scrap will move here from Germany.

Steel Ingot Production by Districts and Per Cent of Capacity



Week of	Pittsburgh	Chicago	Youngstown	Philadelphia	Cleveland	Buffalo	Wheeling	South	Detroit	West	Ohio River	St. Louis	East	Aggregate
Nov. 16	99.5	99.5*	94.0	97.0	102.0*	105.0	98.0	102.0	104.0*	100.0	110.0	82.5	109.0	99.5
Nov. 23	99.5	98.5	94.0	98.0	98.0	105.0	101.0	102.0	102.0	102.0	107.0	82.5	112.0	99.5

* Revised.

MORE STEEL COMING FOR DSC CUSTOMERS

ILLUSTRATION BASED ON RECENT PHOTOGRAPHS

DETROIT PLANT—

Improvements in existing facilities . . . and installation of new equipment . . . will step-up producing capacity here to 150,000 tons . . . increasing the supply of cold rolled strip by about 35,000 tons a year . . . to D S C customers in this area.

NEW EASTERN PLANT

A new cold rolled strip mill at New Haven, Conn. . . . in the final stages of construction . . . will make available to D S C customers in this territory additional producing capacity of 60,000 tons a year . . . practically at their stock room doors.

ILLUSTRATION BASED ON ARCHITECT'S CONCEPTION

Dependable Dan Our Customers' Man Invites Correspondence Regarding Your Normal and Regular Requirements

Frankly, we may be unable to accept new business now, but looking ahead, we would like to keep you informed about our expanding facilities.

Here Is Cold Rolled Strip Steel Producing Capacity Of Over 200,000 Tons A Year

These Detroit Steel Corporation projects . . . part of a multi-million dollar expansion program launched just a year ago . . . are being rushed to completion with all possible speed. As soon as the additional tonnages can be made available for allocation . . . D S C customers will be notified accordingly.

Meanwhile D S C Reminds You . . . That our Detroit Mill . . . Our Reliance Division warehouse network and our Craine-Schrage Steel Division . . . are continuing their all-out effort to help meet your urgent steel needs . . . giving every customer equitable consideration . . . constantly planning and working towards greater production and supply . . . and towards higher standards of steel service.

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PRODUCERS OF
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DETROIT 9, MICHIGAN

RELIANCE STEEL DIVISION

PROCESSORS AND DISTRIBUTORS OF JOB-FITTED SHEET AND STRIP STEEL

General Office: 1025 South Oakwood Ave., Detroit 25, Mich.
Plants: Chicago, Cleveland, Detroit, Lyndhurst, Worcester, New Haven (Under Construction)
Sales Offices: Grand Rapids, Indianapolis, New Haven, St. Louis, Toledo
Products: SHEETS—Hot Rolled . . . Hot Rolled Pickled . . . Cold Rolled . . . Long Terne . . . Galvanized; PLATES; COLD ROLLED STRIP STEEL—Coils and Cut Lengths . . . Slit or Round Edge . . . All Tempers.

★ ★

CRAINE-SCHRAGE STEEL DIVISION

DISTRIBUTORS AND DIRECT MILL REPRESENTATIVES

Warehouse and General Office: 8701 Epworth Blvd., Detroit 4, Mich.
Sales Offices: Grand Rapids, Toledo, Indianapolis
Products: Cold Drawn and Hot Rolled Carbon and Alloy Steel Bars . . . Tool Steels . . . Drill Rod . . . Wire Rope, etc.

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Steel Centers Skating On Thin Ice Of Electric Power Shortage

Some Cuts Ahead But Utilities Have $6 Billion Worth Of New Power on Order

o o o

By GEORGE F. SULLIVAN
Pittsburgh Regional Editor

o o o

Pittsburgh

• • • **Three of the** biggest steel centers in the country are skating on the thin ice of an electrical power shortage. Pittsburgh, Chicago and Cleveland are the sore spots. So far it has caused very little loss in steel ingot output and virtually no loss in finished steel. But Pittsburgh may lose a little finished steel this winter and some semifinished steel may be stockpiled. Electric furnace operators there will probably be asked to make occasional operating cuts for periods of a few hours as they were last winter.

The power shortage is like the steel shortage in one respect. More electricity is being generated today than ever before but there still is not enough to satisfy everyone. It differs in one respect—there is enough power if it could be spread out. That is the objective of most plans to tide industry over this winter, when the shortage will be worse than it has ever been in these areas.

To meet this demand the electrical industry is expanding at a terrific rate. It is committed to spend $1.5 billion a year for the next 4 years on new equipment. Generally speaking, the winter of 1949-1950 is expected to be easier than the coming winter, at current expansion rates for electric producers and users, but the industry does not expect to be fully out of the woods until 1953. By then it is believed there will be a healthy margin of capacity over expected demand.

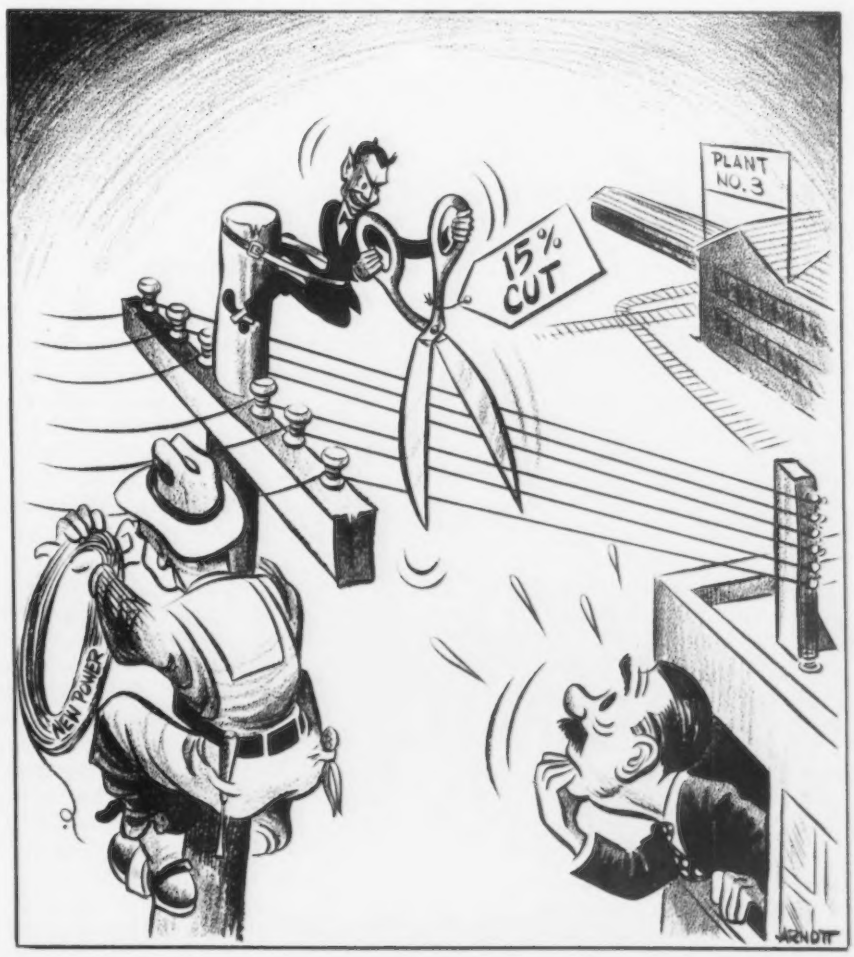
Cleveland industry is now operating on a 15 pct voluntary reduction in industrial power. That part of the Pittsburgh district served by Duquesne Light Co. will come under a similar plan from Dec. 1 to Mar. 1. Chicago has no across-the-board reduction but big users there are prepared to make quick slashes in power use when the system load goes too high. This practice is also used for the remaining portion of the Pittsburgh district served by West Penn Power Co.

In Chicago, Industrial consumers pay heavy charges if they use more than an agreed-upon normal load during peak hours. Conversely, they get a break on overall rates if they cut their requirements at these peak hours.

Some Pittsburgh industrialists are concerned about the cuts they will make—or take—beginning Dec. 1. Like those in Cleveland, they have agreed to reduce their power demand by 15 pct during the daylight peak hours. In Cleveland these are 8 a.m. to 8 p.m.; in Pittsburgh they are 8 a.m. to 9 p.m.; Monday through Friday in both cases. From information gathered to date it appears that the reduction will be bothersome but not serious in its effect on production at most plants.

It will be bothersome because in some fabricating shops it will require rescheduling certain operations to off-peak hours; transferring men from the day to the night shift. But at some of the very big plants this will mean a change in schedule of only a handful of men. Night shift and weekend operations will be stepped up in some shops, old standby generators will be cut in. Steel mills in Cleveland make roll changes during the day-

Pittsburgh MINUS



POWER ADDITION: *This 81,250 kva Westinghouse turbine generator is the newest unit in the West Penn Power Co. system which supplies part of the electrical power for the area around Pittsburgh. The company has another new unit like this one due to be running soon.*

light hours and it is said that no production has been lost there.

Prior to the 15 pct power cut—or "Cooperative Power Load Shift Program"—in Cleveland peak consumption occurred at 10 a.m. Monday through Friday. After the new program went into effect three peaks emerged: 10 a.m., 2 p.m. and 7 p.m., none as severe as the previous 10 a.m. peak.

As in Cleveland, the 15 pct cut will be "voluntary" in Pittsburgh. There have been a few threatened holdouts. To the question, "What if I don't go along?" one answer was that widescale lack of cooperation would threaten to unbalance the system. Engineers would then pull central station switches without warning and no one would know when power would again come on.

The probability of natural gas shortages for industry in these areas this winter makes the electric power shortage loom less threatening. Plants hampered by a gas shortage won't need the power they otherwise would use.

The shortage of electrical power, like the shortage of almost everything else, stems in part from delayed construction induced by the war. But on top of this there has been a tremendous increase in "normal" demand for electric power by individuals, commerce and industry. New industrial processes have increased demand, too.

The war deferred production of generators, transformers and other equipment. After it the orders hit equipment manufacturers in a bunch; some were late, too. Result: not enough capacity when the load is on full. And it takes 30 to 36 months to get delivery on a big turbine generator, about the same time for a large transformer.

The steel industry now uses more electricity per ton of production. So does every other major industry. Specifically, it takes at least 20 pct more electricity to make a ton of steel today than it did before the war. More, bigger and faster cold-rolling mills and wider use of electric furnaces are among the reasons.

So much for some of the reasons there isn't enough power in these steel centers to take care of all comers at any time. What are the future prospects? In Chicago, Commonwealth Edison, major supplier there, is embarked on a $400 million expansion program which will add 600,000 kw to its present 2.4 million kw capacity by 1952. Cleveland Electric Illuminating Co. is spending $127 million on a program that will put a 90,000-kw generator in next May and another in September. Its present industrial capacity is 600,000 kw. Two 75,000-kw units will follow, one in 1950 and another in 1951. In Pittsburgh, Duquesne Light is spending $80 million on two 81,250-kw generators and allied equipment, one due in November of 1949 and another a year later. West Penn Power Co., the other utility in the district, has recently installed an 81,250-kw unit and hopes to have another in operation in about a month.

In the nation as a whole, installed capacity will go from 50 million kw on Jan. 1, 1940, to 70 million on Jan. 1, 1949. From that time until Jan. 1, 1953, the $6 billion which utilities are committed to spend will boost capacity to about 95.5 million kw. This means a doubling of capacity in 13 years.

A spokesman for Cleveland Electric Illuminating Co. said the company does not fear installation of new electric furnaces or new plants moving into the area. By the time new furnaces were installed or new plants built CEI will have enough additional capacity installed and operating to take care of the load. The Chicago story is about the same.

Pittsburgh's situation is a little different. Electric furnace customers of both utilities there have had to cut their load on very short notice to save the systems. Two 50-ton electric furnaces on the Duquesne Co. lines have not been operated since the war because of insufficient power. These are the Navy Ordnance furnaces which will be installed at Allegheny Ludlum's Brackenridge plant next year. With two new ones on order, the Brackenridge plant will increase the load on the West Penn Power System about 60,000 kw, but capacity will be available before the 1949-1950 winter peak to care for them.

Companies moving into parts of Pittsburgh served by Duquesne Light, including the new Fisher Body plant, have been assured that there will be power enough to supply them by the time they are ready for it. But it will still be a close squeeze there until the fall of 1950.

The big manufacturers of electrical power equipment, General Electric and Westinghouse, have substantially increased facilities for this work but are still swamped with orders. This year

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Westinghouse will deliver steam turbine generators with a total of twice the capacity delivered in any prewar year. By 1951 it will be able to ship three times the capacity shipped in any prewar year. General Electric has orders for steam turbine generators with a capacity of 9.5 million kw for delivery over the next 4 years.

Market research men at both companies say there are a lot of generators running today that would normally be scrapped or retired to standby. They predict a good market for this type of equipment for the next 8 to 10 years at least. Tomlinson Fort, central station salesmanager for Westinghouse, estimates the total expenditures of public utilities for new generating and distributing equipment over the next 10 years at $16 billion.

Manufacturers of electrical power generating and distributing equipment bought 1,264,952 tons of steel in 1947. The 1948 figure will be higher. Electrical power consumption today is double what it was a decade ago. Under normal business conditions that demand will double within the next decade. In money this means the electrical utility industry will have to double its investment during the next 10 years. For steel companies this looks like a fairly reliable source of continued business.

New Agitator on Market

Pittsburgh

• • • **The Engineering** & Construction Div., Koppers Co., Inc., has signed an agreement with Dr. Bronislaw Goldman, Pittsburgh consulting engineer, whereby it will be able to furnish the Goldman agitator for chemical or other industrial plant installations.

The company states that the Goldman agitator, recently patented in America, works on a new principle which is so efficient that mixing or washing time of chemicals is reduced materially.

The agitator is so constructed that it propels liquid to the sides of the tank and upward. At the top, the liquid is drawn to the center where it is pulled downward through the hollow axis upon which the agitating blades are fastened. It is expelled from the bottom of this hollow axis to repeat the process. Several installations of the agitator are now being made.

Allots $37 Million For Chinese Reconstruction

Washington

• • • **The Economic Cooperation** Administration last week made provisional allotment of $37 million as part of the proposed $70 million reconstruction and replacement program for China.

Approximately half will go into rehabilitation of Chinese coal, tin, antimony and other mines. The remainder will be used to restore communication and transportation and to reconstruct chemical and fertilizer plants.

Included among the projects are tin and antimony mines in south and southwest China, $2 million; tin, antimony and tungsten pits in south central and southwest China, $500,000; and the Hwainan, Nanking and Kaokeng coal mines, $8 million.

Ford Finishes Factory

Stockholm

• • • **Ford's new factory** here is now completed. It will have a production capacity of 15,000 vehicles a year.

Since the factory is not allowed to import motor-car parts under Sweden's new and sharply reduced import program, the plant is unable to start full production and some workers have been laid off.

General Motors (Sweden), hampered by the same import restrictions, have laid off over 800 of their 1,440 employees.

Profits Up; Authorize New Coal Washing Plant

Youngstown

• • • **Net profit of** $7,306,000 for the third quarter of 1948 was reported by Youngstown Sheet & Tube Co. This compares with $5,609,764 for the second quarter of 1948 and $4,817,698 for the third quarter of 1947.

Net sales and other revenue for the quarter amounted to $96,576,674, while cost of sales and other operating expenses amounted to $79,040,124. The company allowed $2,789,190 for depletion of minerals and depreciation of plants; $1,500,000 for contingencies; $234,360 for interest on funded debt and other interest charges and $5,707,000 for federal income taxes.

Directors have authorized construction of a new coal washing plant at its coal mines in Dehue, W. Va. The plant is to be completed next summer.

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URANIUM RUSH: *Robert Campbell, Toronto mining man who discovered pitchblend ore rich in uranium along the eastern shore of Lake Superior 70 mi north of Sault Ste. Marie, Ont., attaches government plates to his claim stakes. Strike has started a rush of prospectors to the area.*

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Industrial Briefs . . .

• VISITORS — Messrs. W. H. Stratford, G. Wilson, G. D. Whitehouse and H. Cowlishaw, of the English Steel Corp., Ltd., Vickers Works, Sheffield, England, have recently arrived in New York. They are visiting manufacturing plants in the United States and will return to England about Dec. 10. Their headquarters are at A. Milne & Co., 741 Washington St., New York.

• OPEN HOUSE—More than 3000 visitors attended the open house held recently at the new million dollar warehouse of Korhumel Heffron & Preiss Steel Co., Evanston, Ill. The new warehouse contains 100,000 sq ft entirely under crane and has greatly increased facilities for slitting, shearing, roller leveling, etc.

• PROPOSES NEW LAB—A new laboratory building for metals processing studies is among the projects proposed in a $20 million development program announced recently at the Massachusetts Institute of Technology, Cambridge, Mass. One of the principal units of this laboratory will be a modern machine tool laboratory.

• CENTENNIAL—C. G. Hussey & Co., Pittsburgh's only copper rolling mill and one of the oldest companies in the region, celebrated its one hundredth anniversary recently.

• ACQUISITION — Stewart-Warner Corp., Chicago, has purchased the Heating Research Corp., Anderson, Ind., producers of the Saf-Aire gas heater. Production, marketing and other operations of the new business will be integrated with the South Wind Div. of Stewart-Warner at Indianapolis.

• WELDROD AGENTS — Ampco Metal, Inc., Milwaukee, has appointed Welder Service Co., 2037-41 Canton St., Toledo, as distributor for their complete line of rods.

• GALVANIZING PATENT—Rheem Mfg. Co., New York, has been awarded a patent covering the company's unique method of assembling zinc coated containers after galvanizing, a procedure which governs the company's entire mechanized process of tank manufacture. Other patents applied for refer to the complete system of automatic conveyerized galvanizing, as developed by Rheem.

• ENGINE ORDER—An order for the production of 100 steam locomotives, amounting to approximately $14 million for the Indian Government Railways has been placed in Canada. Sixty locomotives will be built by Montreal Locomotive Works, Ltd. and 40 by Canadian Locomotive Co., Ltd., Kingston, Ont. Payment will be made in U. S. dollars.

• OPENS NEW LAB—The formal opening of the new Hanson-Van Winkle-Munning electrochemical laboratory at Matawan, N. J., was celebrated last week. The three-story laboratory was erected for the sole purpose of carrying on experimental and service work in the electroplating and polishing field.

• BUYS COAL MINE—Pittsburgh Plate Glass Co., Pittsburgh, has acquired controlling stock interest in the Midvale Coal Co., Midvale, Ohio. The coal company is being liquidated and its mine will be operated as the Columbia Coal Div. of Pittsburgh Plate Glass Co.

• TO REPRESENT—Bedford Tool & Forge Co., Bedford, Ohio, has named Milwaukee Chaplet & Mfg. Co., 1023 S. 49th St., Milwaukee, as exclusive representative in the state of Wisconsin and western Michigan, to handle their line of chipping chisels.

• LEASES PLANT—General Electric, Schenectady, has leased from the War Assets Administration the former Remington Rand plant in Johnson City, N. Y., to manufacture special equipment for the Air Force.

All Time Record Seen In Open Market Scrap Consumption in U.S.

Washington

• • • **Consumption of** purchased or open market iron and steel scrap in 1948 will set a new high record at about 29 million gross tons. That is the prediction of Edwin C. Barringer, executive vice-president of the Institute of Scrap Iron & Steel, Inc., Washington.

This would be 15 pct greater than the all time record of 26 million tons, established in 1947. It would be a third larger than the wartime peak of consumption.

"Based on Bureau of Mines statistics, the melt of home or intra-plant scrap this year will barely exceed the 28 million gross tons of last year, while pig iron will do well to equal the 52 million tons of 1947. It is purchased scrap that is making possible record steel mill operating rates."

Of the 29 million gross tons of purchased scrap that will be melted this year to make new steel and castings, about 7 million tons will be the waste of manufacturing operations and 4 million tons will be provided by the railroads, according to Mr. Barringer. The remaining 18 million tons will come from auto wrecking yards, farms, wrecking operations, collectors, demolition, shipbreaking, and other sources. Imports, principally from Germany, will account for about 300,000 tons.

In addition to melting record breaking tonnages of scrap, steel mills and foundries have put about 1 million tons into inventory this year, he declared.

Destroyed Plant Replaced

Liptonville, Tenn.

• • • **A new soybean** oil solvent extraction plant was started here about the middle of November by the West Tennessee Soya Mill Co. The new plant replaces the firm's expeller mill which was destroyed by fire earlier in the year. Allis-Chalmers Mfg. Co. of Milwaukee completely engineered the 150 ton per day plant. Allis supplied the equipment, including machinery for bean preparation, oil extraction, solvent recovery and meal conditioning.

UNIVERSITY OF MICHIGAN LIBRARIES

Chester Furnace to Resume Output of Basic Iron By End of Month

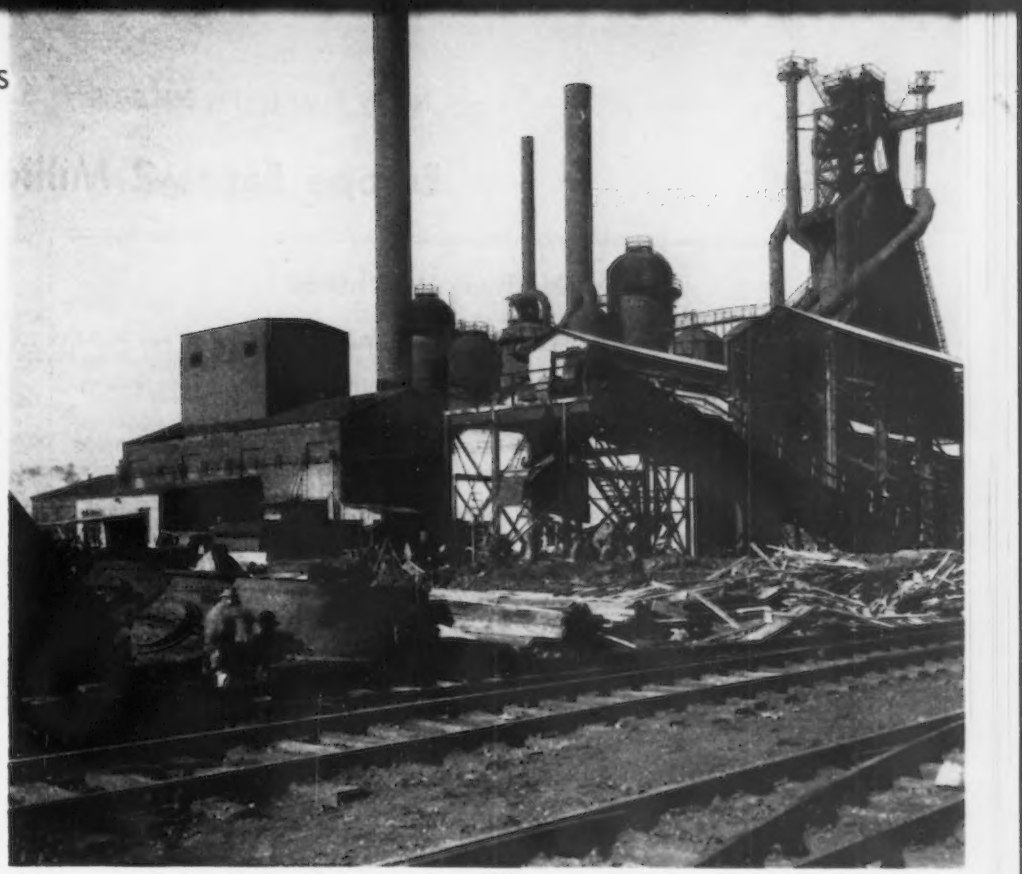
Chester, Pa.

• • • **The old Chester** blast furnace will be back in production again at the end of this month producing about 400 tons of basic iron a month from foreign ores and beehive coke. It will be operated under the name of Allied Iron Works, Inc., Chester, a corporation whose ownership is held to the extent of 75 pct by Stanolind Oil & Gas Co., Tulsa, Okla., a subsidiary of the Standard Oil Co. of Indiana. The remaining share of the company is held by Brown Engineering Co., Houston, Tex.

Rehabilitation of the furnace, now being rushed to completion by H. A. Brassert & Co., New York, is expected to reach about $2 million, exclusive of the cost of inventories of raw materials. This cost, much higher than originally contemplated, has been swelled by large expenditures for two used boilers, a pig casting machine, dock repairs and dredging, and plant transportation equipment and cranes. The rehabilitation cost is estimated to approach half the cost of establishment of a new furnace of the same capacity. But materials are not available to permit new construction.

The anticipated 400 ton a day production rate is higher than ever reached before by this furnace. It will be obtained largely through the use of carbon blocks for a thinner lining up to the mantle, a new departure in furnace construction. By this means the diameter of the hearth has been increased from 14 ft 6 in. to 15 ft 9 in. In addition, the bosh has been made steeper. The previous bosh construction, said to have been too flat, is reported to have reduced the wind, cut production of iron and caused breakouts of metal in the hearth.

There has been a furnace at Chester since 1880. Until about 1931, it was operated as the Delaware River Steel Co., but remained idle for the next 10 years. Early in the war the government equipped it as a ferromanganese producer and spent slightly over $1 million in the process. However, it never went into production of ferromanganese. For 18 months, to the end of 1943, it produced basic pig iron as the Pittsburgh Ferromanganese Co. This company reached a maximum production of some 350 tons a day using as much as 25 pct of scrap in the charge. Under the ownership of the Delaware River Steel Co., foundry iron production averaged 275 to 300 tons a day.



Chester furnace currently undergoing repairs.

When the Brassert staff began its reconstruction operations, a great many unexpected difficulties were encountered. Underground piping was found all over the property, but there was no plan to designate its location. There had been little or no plant maintenance work since the furnace went out of production. All equipment was in very bad shape. Water entered the plant during this period and burst piping after freezing. Labor conflicts among various unions are presently upsetting the work schedule, and skilled turn foremen are very difficult to hire.

Foreign ores will be used almost exclusively for the plant's operation, coming from Brazil, Spain, Sweden and French Morocco. A small amount of domestic ore can be obtained. Current plans call for a working inventory of 30,000 tons of ore. Beehive coke from the Connellsville district will be used, although some byproduct will be available to blow in the furnace. A working inventory of 20,000 tons of coke is to be carried.

Ore and coal shipments are already on hand and the problem of space for storage is critical. The furnace is surrounded by the plant of the Philadelphia Gas & Electric Co. which formerly was a supplier of coke to the furnace, making a large coke reserve at the furnace unnecessary. Docking facilities are owned by the gas and electric company but costly dredging was required and docking equipment had to be put into shape.

Two old vertical blowers will be used until the end of the year when it is expected that the new Ingersoll-Rand turbo-blower with a capacity of 30,000 cfm at 25 psi pressure will be installed. A new plant for the screening and crushing of ores costing $125,000 is now under consideration. The new pig machine already installed is a single strand 145 in. Bailey that will handle the full output of the furnace.

No pig iron will be available for sale when the furnace gets into production, as it will be used by the owners exclusively in trading for line pipe. It is a problem

(CONTINUED ON PAGE 142)

Europe Faces 2 Million Ton Scrap Deficit

Why This Study Was Made

Geneva

• • • At the end of the war European reconstruction was held up by two major bottlenecks: coal and steel. The latter was to a great extent a consequence of the first. Lack of coke was the reason why numerous blast furnaces in perfect working order were kept idle.

However, steel can be produced also by remelting scrap. And Pig iron output can be increased, with the same amount of coke, by adding to the blast furnace a certain percentage of scrap. Thus scrap developed into a raw material of major importance for the reconstruction of Europe.

Although war damage scrap could be expected to be abundant all over Europe, the quantities needed to compensate for the lack of coke and for normal consumption are of such magnitude that scrap developed into a bottleneck. Hence the Steel Committee of the Economic Commission for Europe decided to select a panel of scrap experts. They were invited to study on-the-spot measures to increase scrap collection.

This panel has already visited England and France. While continuing their work, a general survey on the scrap situation in Europe was prepared, at their request, by the Secretariat of ECE.

This study was presented to the third session of the Steel Committee in September and was generally approved. On the basis of these discussions the present revised version was released for publication.

Geneva

• • • **Before the war** Europe obtained scrap from four main sources.

Prewar Scrap Sources of Europe and U. S.

Type	Prt of Total Scrap Consumption In Europe	In U. S.
Circulating Scrap	45	53
Process Scrap	22	19
Capital Scrap	28	28
Imported Scrap	5	0

Although it represents the smallest fraction in the total, "Imported Scrap" is one of the most important of the four sources to consider for the future. This is because it is unlikely that Europe will be able to obtain imports of scrap as it did before the war. The main source of these imports was the U. S.

Year	Europe's Imports of Scrap from U. S. (In thousands of metric tons)
1936	735
1937	1897
1938	1487
1939	1291
Total 1936 1939	5410 or a yearly average of 1352

The table on "Europe's Trade in Scrap" shows that whereas Europe, in 1936-1938, imported on an average just under 1.5 million tons (supplied mainly by the U. S.), there will be an important deficit of 1.9 million tons in 1948 on the basis of individual countries' requirements and availabilities.

A very small part of this deficit —say 0.1-0.2 million tons—may be covered by imports from other continents. But the effect of these imports will be more than offset by exports of German scrap to the U. S. The apparent deficit of European countries should, therefore, be set at over 2 million tons in 1948.

Shortage of coke has played an important role in the unbalance of European scrap supplies. With inadequate supplies of metallurgical coke, scrap has to be used in blast furnaces in a proportion well above the normal level [this saves melting time, and thus coke]. In some countries this amounts to a 25 to 30 pct charge instead of the 10 pct used before the war.

The shortage of coke has also caused pig iron to be in short supply. Thus a greater proportion of steel is produced in openhearth furnaces. Moreover, the proportion of scrap to pig iron used in openhearth furnaces is shifted in favor of scrap.

A striking example of these effects is the complete reversal of the scrap situation in Belgium and Luxembourg which used to export some 336,400 tons and are now demanding imports of 625,000 tons. This is a net difference of 961,400 tons.

On the other hand, Germany, instead of importing scrap as she did before the war, should in 1948 export a sufficient quantity to European countries to offset the loss of other intra-European exports.

Also contributing to the European scrap deficit is the cessation of scrap imports from the U. S. Before the war European steel industry relied on them for some 1.4 million tons—or 5 pct of its scrap supplies.

This adverse effect is aggravated by U. S. imports of European scrap. These are expected to bring the difference with prewar to about 1.8 million tons.

Despite the apparent deficit of 2 million tons for 1948, it does not appear that the shortage of scrap has had so far (October 1948) a very adverse effect on European steel production. Output has been rising steadily since the beginning of the year. Here are some reasons why this was possible:

(1) Existing stocks of scrap were drawn on heavily. In some countries they are now reaching a dangerously low level.

(2) Scrap drives in some countries have been greatly successful. England is a good example.

(3) Stated import requirements have proved, in some cases, somewhat inflated.

Nevertheless, it seems that steel production would have risen further in some countries if their supplies of scrap had been more abundant.

The scrap situation in 1949 will probably be affected by the following factors:

FAVORABLE

(1) Scrap requirements for blast furnaces should be reduced as a result of improved supply of coke.

(2) Supplies of pig iron for steelmaking should be better.

(3) Exports of scrap from the Bizone of Germany should be increased.

(4) Increased supplies of capital scrap should result from the greater possibilities of replacing capital equipment.

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According to Study By Steel Div. of UN

UNFAVORABLE

(1) Shortage of rich iron ores (10 to 15 pct of import requirements) is expected.

(2) A decrease is expected in the supply of war damage scrap.

(3) Increased demand for scrap will result from increased steel production.

(4) An increase in scrap exports to other continents is expected.

On the basis of present evidence it is likely that European steel production will be more affected by the shortage of scrap in 1949 than in 1948. It is also likely that steel production capacity will be lying idle in Europe because of scrap shortage. This is apart from capacity liable to remain unused owing to coke and iron ore shortages.

The most immediate remedy would be to increase further the exports of German scrap to the benefit of the European countries. Germany is now the only big reservoir of scrap. It is generally estimated that well over 10 million tons of war damage scrap could be recovered there.

Another remedy would be a better organization of capital scrap collection and a speedier return of process scrap to blast furnaces or steel works. Results of British scrap collection efforts during the past 12 months have surpassed all expectations. It appears that 1 million tons of scrap have been collected there solely as a result of a scrap campaign systematically organized.

The present total production plans of all European countries envisage an increase of 12.08 million tons of steel and 11.8 million tons of pig iron over the yearly average of 1936-1938. If these plans are carried out the gap between steel and pig iron will decrease from 22 pct to 18 pct of the total steel production.

Assuming that the proportion of pig iron production used for steel making will increase to 86.5 pct compared with 85.5 pct in 1936-1938, it becomes obvious that the average consumption of scrap per ton of steel produced will decrease. The question remains as to whether this decrease in specific scrap consumption will be sufficient for Europe to dispense with the prewar imports from other continents of some 1.5 million tons of scrap and 0.5 million tons of pig iron.

This question is the crux of the European scrap problem. On basis of present evidence it is most unlikely that in the future Europe will again be able to import scrap and pig iron on the same scale as prewar.

In order to assess the probable scrap situation in 1951, a calculation has been made estimating both the probable demand and supply of scrap in that year. First the prewar situation has been calculated in detail in the following manner:

Estimated Prewar European Scrap Consumption
(all figures in million tons)

To produce in 1936-1938 Crude Steel at a yearly average of	53.04	
Statistics prove that the metal consumed (109 pct) amounted to		57.82
From the quantity of metal required it has been possible to derive a figure for actual consumption of scrap in steel making by subtracting the total pig iron used for steel making in Europe in that same period		35.84
This amount of pig iron was obtained by subtracting from the total pig iron production	41.33	
the quantity of pig iron used in the iron industries (14.5 pct)	5.99	
and by adding the net pig iron imports from other continents	0.5	
Thus a figure is arrived at for a consumption of scrap for steel making of		21.98
to which has been added the quantity of scrap used in iron industries and in blast furnaces (7.5 pct)		3.00 3.10
This calculation arrives at the figure for the estimated total of prewar consumption of scrap for the whole of Europe of		28.08

In order to estimate the sources from which this total supply of 28.08 was obtained, a further calculation has been made by deducting from this total:

(1) The recorded net imports of scrap from outside Europe..... (1.48)

(2) The supplies of circulating scrap (24 pct of crude steel production) .....(12.73)

(3) The supplies of process scrap (18 pct of finished steel consumption) ..... (6.52)

It has been estimated that the remaining balance of 7.35 million tons must have been covered by the collection of capital scrap in Europe. This calculation was then repeated for the year 1951 and is shown in detail below:

Estimated European Scrap Consumption and Production in 1951 (in million tons)

1951 Targets			
Crude steel production	65.12		
Metal required (109 pct)		70.98	
Metal supplied			
Pig iron: total production	53.13		
of which 86.5 pct for steelmaking		45.96	
Scrap in steel furnaces		25.02	
Scrap in blast furnaces (7½ pct of 53.13)		3.98	
Scrap in foundries (estimated at 50 pct of foundry iron)		3.59	
Total apparent requirement of scrap		32.59	
Sources of supply			
Circulating scrap (including "chutes des usines de transformation") 24 pct of 65.12	15.63		(48 pct)
Process scrap: 18 pct of finished steel consumed in Europe (73 pct of 65.12 minus 3.0 net export to other continents)	8.02		(24.6 pct)
Difference to be covered by capital scrap	8.94		(27.4 pct)

The last point which has to be demonstrated is whether or not Europe will be able to collect some 9 million tons of capital

Terms Used In Digest of Study

New York

• • • Due to the wide interest in European scrap potentials and problems the Editors of THE IRON AGE have decided to publish a digest of the European scrap study prepared by the Steel Div. of the United Nations' Economic Commission for Europe.

Space limitations do not permit publication of the full 29-page study. The complete paper can be obtained on request to the Steel Div. of the E.C.E., Palais de Nations, Geneva.

All data and conclusions are those of the Steel Div. and do not necessarily reflect the opinions of THE IRON AGE.

In order to save space, descriptions of terms used in the study have been condensed into the following handy package:

"Europe"—is intended to mean "Europe, excluding the Soviet Union." Lack of information on Russia prevented inclusion of estimates on that country.

"Circulating Scrap"—is home scrap arising at steel works. It consists of ingot crops, waste in rolling, split metal, etc. It should increase pro rata with steel production.

'Process Scrap"—is scrap resulting from fabrication in the metal working industries. Supplies should increase pro rata with the finished steel consumed.

"Capital Scrap"—or old scrap—arises out of obsolete equipment, railway, ships, etc. Supplies are more or less proportionate to the steel consumed some 5 to 15 years earlier.

EUROPE'S TRADE IN SCRAP
(in 000 metric tons)

Countries	Net Imports			Net Exports		
	1936/38 Yearly Average	1947	1948 Requirements	1936/38 Yearly Average	1947	1948 Availabilities
Austria	32.6	0	120	0	72.9	0
Belgium-Luxembourg	0	198	625	336.4	0	0
Czechoslovakia	153.3	27	545	0	0	0
Denmark	0	0	0	98.6	48.4	45
Finland	8.4	*	60	0	0	0
France	0	0	0	362.1	33.6	0
Germany	652.4	0	0	0	400†	1,200†
Saar		83	132		0	0
Hungary	55.9	0	18	0	0	0
Italy	520.1	74.6	775	0	0	0
Netherlands	0	0	45	324.9	59.9	0
Norway	0	0	5	25	6	0
Poland	506.4	52.7	400	0	0	0
Rumania	43.8	*	45‡	0	*	0
Sweden	61.9	61.8	60	0	0	0
Switzerland	0	50.8	80	71	0	0
United Kingdom	720.5	378.3	1,040	0	0	0
Other Countries	0	*	0	36	*	800§
Total	2,755.3	926.2	3,950	1,254	620.8	2,045

*—Not available.
†—Bizone only—estimate.
‡—Secretariat's estimate.
§—Secretariat's estimate, including Soviet Zone, of Germany's exports to European countries.

scrap in 1951. This figure represents a 21.6 pct increase over prewar collections.

It is very difficult to find an accurate relationship between the production of steel and supplies of capital scrap. But it seems that over long periods of time supplies of capital scrap rise approximately in the same proportion as steel production.

In 1951 the European steel production should be 22.6 pct above the average for 1936-1938. An increase of 21.6 pct of capital scrap supplies should certainly be possible. As a result of the war and the post war steel shortage, the replacement of a great amount of capital equipment has become long overdue. With steel becoming more plentiful, this replacement will be possible. Thus the extensive modernization programs which all the European countries have planned should yield a large increase in supplies of capital scrap.

The collection in the whole of Europe of 9 million tons of capital scrap should be possible, since England alone is planning to collect in 1951 some 3.5 million tons, and the Bizone of Germany at least 2.4 million tons, of capital and war damage scrap. This would leave just over 3 million tons to be collected by the remaining European countries, including France and Italy.

Conclusion

In conclusion it may be said that self-sufficiency in scrap is possible and probable for Europe by 1951 but in order that it may be achieved, relentless efforts must be made to—

(1) raise the production of pig iron as much and as quickly as possible;

(2) speed up the return to the steel and blast furnaces of circulating and process scrap;

(3) collect every available piece of capital scrap;

(4) retain for use within Europe all the supplies of scrap originating on this continent;

(5) resume the extensive prewar trade in pig iron and scrap among all European countries in order that the potential surpluses of pig iron and scrap of certain countries may benefit those countries which have to rely on imports of these materials.

Facts Don't Support UN Report on Scrap, Says Charles Sawyer

Washington

• • • **Secretary of** Commerce Charles Sawyer says that the facts do not support the Nov. 11 statement of the United Nations Economic Commission for Europe to the effect that some of Europe's steel production capacity probably will still be idle next year because of the lack of scrap iron and that one reason for the shortage of scrap is the large export of scrap from Germany to the United States.

"It is true," Mr. Sawyer stated, "that our continued effort to get scrap from Germany to the United States has produced some results, but as yet they are far from satisfactory to me. Up to July 1 there had been exported only 4000 tons of iron and steel scrap to this country. Following that, July exports from Germany to the United States were 9500 tons, for August 24,700 tons, for September 67,000 tons, and for October 51,000 tons, making a total of 156,000 tons. Of this tonnage 49,000 tons were our own army scrap. During this period there were large exports of scrap from Western Germany to other European countries, amounting to at least 1,075,000 tons."

"Moreover," he added, "the report to the Secretary of Commerce of March, 1948, by a Joint Industry-Government Mission conservatively estimated that there were 10 million tons of scrap in Bizonal Germany, enough not only to take care of Western Germany and the other ECA nations in Western Europe, but also to help take care of our requirements. More recent information indicates that there may be as much as 15 million tons of scrap in Western Germany.

"I am also informed that German steel mills have such large inventories of scrap in their plants that shipments of scrap to these mills have been stopped. If the United States had not received a single pound of indigenous scrap this year and the European steel mills could have used this scrap, European production would have been increased by only two tenths of one pct."

More Nails for Canada

Ottawa

• • • **Canada produced** 7798 tons of nails in September against 7662 tons in the previous month and 6879 tons in September, 1947.

For the 9 months ending with September nails produced in Canada totalled 63,295 tons compared with 56,866 tons in the corresponding period last year.

Production of steel wire in September amounted to 28,619 tons against 22,875 tons in August and 27,266 tons in September, 1947.

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Nations Getting ECA Aluminum Exporting to U. S. at Premiums

Big Tonnages Involved; Sales At Markups of 50-70 Pct Over Domestic Prices

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By JOHN ANTHONY
Eastern Regional Editor

o o o

New York

• • • **Aluminum producers,** hamstrung by power shortages in their efforts to meet the requirements of their customers, are aghast at the tonnages of scrap, primary ingot and mill products currently being imported from Marshall Plan nations for sale at markups of 50 to 70 pct over the domestic market.

Imports of aluminum from western Europe began soon after the inauguration of the Economic Cooperation Administration's program on Apr. 3 and are constantly accelerating. Current aluminum imports from this area, as reported by the Census Bureau, have reached 55 pct of ECA-authorized shipments. In the 6 months to the end of September, ECA has authorized the purchase of 200 million lb of primary aluminum by western Europe at a cost of $26 million. The tonnage was to come almost exclusively from Canada at a price of 16¢ per lb. But in 5 months of that period aluminum imports from western Europe totaled 44 million lb. Nearly 42 million lb came in as scrap, 2¼ million lb as ingot and 850,000 lb as sheet.

The foreign ingot has been sold in this market as high as 27¢ per lb, a 50 pct markup over the domestic ingot price. Foreign sheet is sold as high as 50¢, for grades priced by domestic producers at 30¢.

ECA officials are studying the significance of the import statistics so as to avert developments such as this. They are aware of the problem and are attempting to work out steps to control the two way traffic. Were it not for the dollars provided by ECA, western Europe would be unable to buy Canadian aluminum and this tonnage would come into the United States to relieve the shortage here. However, the problem is not a simple one, for reports from Europe indicate that the Russians and their satellite states stand ready to buy this aluminum and pay for it in gold.

Producers say that authorizations for Canadian aluminum are for tonnages in excess of the capacity of war-torn Europe to make use of in its present stage of recovery. They feel that the scrap, ingot and semifinished products now being exported could be used to better advantage by foreign producers, mills, foundries and fabricators for the production of finished products. There might well be an exportable surplus of such products, to which there would be no objection. But the tonnage of low-priced Canadian aluminum available to domestic consumers would be considerably higher than at present.

The 44 million lb of aluminum imported into the United States in the 5-month period does not reflect the full extent of the aluminum surplus in ECA nations. European speculators have been auctioning off aluminum to the highest bidder ever since ECA shipments created an aluminum surplus in western Europe. We have no complete record of the export tonnages siphoned off by eastern European buyers. But the tonnages of foreign aluminum bought by aluminum-starved domestic consumers went at prices as much as 50 to 70 pct higher than the prices of North American producers.

Ironically enough, this unwholesome situation boomerangs from the effort of ECA to give adequate quantities of aluminum to western Europe at the lowest possible price. Through the cooperation of producers in Canada and the United States, ECA obtained aluminum at the prevailing domestic price of about 16¢ per lb, although the worldwide shortage makes it possible to get a much higher price in world markets. Foreign aluminum production is much higher priced, hence there is every incentive to use all the ECA aluminum obtainable while disposing of their own metal through the export market.

Aluminum producers recognize that the purpose of the ECA program is to permit reconstruction of the nations of western Europe so that they may regain their place in world markets. But they say these exports do not contribute to

ECA Aluminum Authorizations
Apr. 3 to Sept. 30
(in pounds)

United Kingdom	181,879,040
France	6,063,680
Netherlands	7,584,640
Germany (French Zone)	1,554,560
Greece	1,653,120
Denmark	483,840
Total	199,218,880

U. S. Imports of Aluminum
From Western Europe, 1948
(in pounds)

Source: U. S. Bureau of Census

April	2,461,428
May	2,702,814
June	4,778,109
July	16,544,743
August	18,505,559
Total	44,992,653

Aluminum Exports from ECA Countries to the U. S., April-August 1948
(pounds)

Country	Scrap	Ingot	Sheet
United Kingdom	19,464,036	595,192	164,692
Germany	9,584,602	.....	.....
Netherlands	2,941,883	.....	683,812
Switzerland	.....	1,146,392	1,552
Belgium	1,385,336	50,000	.....
Italy	4,712,075	.....	.....
Sweden	3,822,160	.....	.....
Norway	.....	440,920	.....
Total	41,910,092	2,232,504	850,057

the rehabilitation of those nations. Their normal exports are finished products, not raw materials. But the aluminum they are selling for export is in substantially the same raw material form as the metal being supplied to them under ECA.

There is no present indication of any decline in the tonnage of aluminum imports from western Europe. Tonnages have increased every month since the ECA authorizations began. Reports on incoming cargoes since August show that large tonnages are still entering the country.

The metal trade press carries on its advertising pages any number of offerings of large quantities of aluminum by import agents. One offers sheet in carload lots. Another, who states he represents large European producers, offers ingot, sheet, rod, wire, foil and extrusions. Among others, three London firms are offering large tonnages of sheet, rod and bar.

The 200 million lb of ECA aluminum purchases authorized for the first 6 months of the program represents an average of 33 1/3 million lb per month. During the first 2 months, April and May, aluminum imports were the equivalent of 7½ pct of authorizations. By July and August, the ratio had jumped to 55 pct. More recent data are not available. However, authorizations for the fiscal year beginning July 1948 total 504 million lb, an increase of tonnage to a monthly average figure of 42 million lb.

With the aluminum shortage in this country growing more critical every month, producers say it is essential that the ECA aluminum program should be reduced at once to appropriate size so as to protect the interests of domestic consumers. It is unreasonable, in the view of producers, for consumers to be required to pay large premiums for the equivalent of metal shipped abroad at government expense.

Canadian Government May Finance Building More Blast Furnaces

Ottawa

• • • **The Canadian** government may finance the building of additional blast furnaces in Canada to provide pig iron for increased steel production necessary to meet steadily increasing demands and relieve shortages. The exact number of blast furnaces to be built has not been made known, nor has their location. However, it is reported that provision will be made in the forthcoming budget for the required expenditure.

It is further pointed out the government will not operate the furnaces under public ownership, but they will be leased to Canada's large steel companies, and it is understood that eventually the operators will be given an opportunity to purchase the stacks from the government.

Dominion Steel & Coal Corp. is reported lining up a large-scale expansion program for its Sydney works to be presented to the Federal government. The proposed program is based on a lengthy survey and will be presented to Trade Minister Howe. C. W. Anson, general manager of the Sydney plant, declined to comment on details of the plans to be submitted to Ottawa, but Montreal interests stated the expansion would be "in a general way."

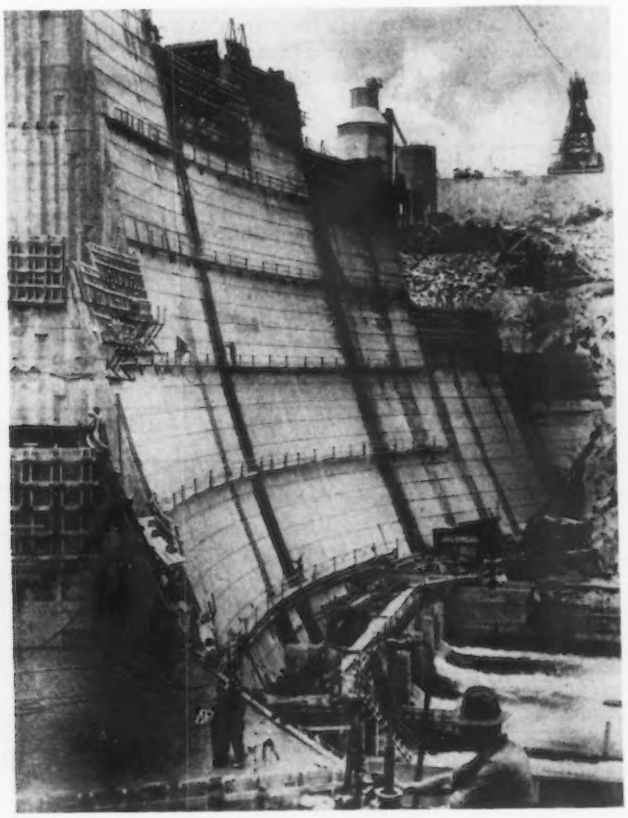
Requests Supreme Court To Review Inland Case

Washington

• • • **The Supreme Court** has been asked by the United Steelworkers (CIO) to review a decision of the Seventh Circuit Court of Appeals which in effect prevents the Steelworkers from bargaining with the Inland Steel Corp. for a pension and retirement plan because the union officers had not signed non-Communist affidavits.

The circuit court decision upheld a ruling of the National Labor Relations Board. The court held that Inland was bound by the Taft-Hartley Act to bargain with the union on terms of a pension and retirement plan. But the court added that such bargaining could not be held until the union officers signed non-Communist affidavits as required by Section 9 (h) of the law.

The Supreme Court has already agreed to review the non-Communist provision of the law in a case involving the American Communications Assn. (CIO). The ACA case involves a collective bargaining election and not pension and retirement bargaining.



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TASMANIA: *The island is rich in natural resources and its government has ambitious plans for their development. First step, however, calls for large hydroelectric resources. Here, under construction, is Clark Dam at Butler's Gorge. After completion, some* 485 *million gal of water per day will pass continuously through a power station at the foot of the dam and generate* 14,000 *hp.*

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WAA Leases Two Plants To Companies Holding Government Contracts

Washington

• • • **War Assets** Administration has approved the leasing of two surplus government-owned industrial plants which will be used for the production of military equipment for the Dept. of the Air Force.

One plant (Plancor 821) is located in Johnson City, N. Y., and was operated during the war by the Remington-Rand Co. for the manufacture of airplane propellers and spare parts. It has been leased to the General Electric Co. for the fulfillment of new government contracts.

The other property leased (Plancor 220) is located in Milwaukee and was operated during the war by the A. O. Smith Corp., for the production of airplane landing and tail gear equipment. It has now been leased to the A. C. Spark Plug Co. of Flint, Mich., and will be used to produce military equipment.

Both leases are subject to an opinion by the Dept. of Justice that they do not violate the federal antitrust laws.

Justice Dept. Gains Consent Judgment In Abrasive Grain Suit

Washington

• • • **The Justice Dept.** has announced the entry of a consent judgment in an antitrust suit against the Abrasive Grain Assn. and the following abrasive manufacturers: Carborundum Co., Niagara Falls, N. Y.; Norton Co., Worcester, Mass.; Exelon Co., Tonawanda, N. Y.; General Abrasive Co., Inc., Niagara Falls; and American Abrasive Co., Westfield, Mass. The government's suit had charged price fixing and other illegal restraints in the sale of artificial abrasives.

The judgment orders the defendants to refrain from fixing prices and uniform conditions of sale of artificial abrasive grain, or from exchanging price lists or quotations among themselves.

It also requires the defendant manufacturers to give purchasers of artificial abrasives the option of purchasing at a delivered price, or at a factory price based on the delivered price less actual cost of transportation.

Herbert A. Bergson, Assistant Attorney General, said "The artificial abrasives involved in this case are widely used industrially for polishing, grinding and buffing such products as lenses, glass, granite, marble and gems. They are basically important to the construction, automotive, plumbing supply, hardware, glass, optical, stone and gem polishing industries. The membership of the defendant Abrasive Grain Assn., which is bound by this judgment, manufactures 98 pct of all abrasive grain available in the United States."

"The judgment entered in this antitrust suit will bring about competitive prices and selling policies by the manufacturers of this important industrial product. Industry and the public will benefit from our action as prices of abrasives have a direct effect upon costs in a large number of our basic industries," Mr. Bergson stated.

HIS MERRY LOCOMOBILE

New York

• • • **Vito Freselene is one guy** who can still sing an old tune and really feel right in place while doing it.

In 1945 he bought an old steam carriage that was built in 1901 by the Locomobile Co. of America. Its power plant consists of a 3½ hp 2-cylinder steam engine and a fire-tube boiler containing 308 seamless steel tubes, ½ in. diam and 20-gage in thickness.

The historic model will be exhibited under the joint sponsorship of the A. B. Murray Co., Inc., and its affiliate the Murray Tube Works at the 18th annual national exposition of Power & Mechanical engineering at Grand Central Palace here during the week of Nov. 29 to Dec. 4.

The vehicle was originally purchased by General Paul A. Oliver of Elizabeth, N. J., for his niece. However, it was not operated after 1909 when the boiler burned out.

After Freselene bought the car he called on the A. B. Murray Co. of Elizabeth for the materials to build a new boiler which he did in his spare time, and subsequently installed it.

Since the overhauling job, Vito has toured over approximately a thousand miles in and around northern New Jersey. He's probably an odd sight but still seems to get there. On time—well, now that's another question.

Voluntary Allocations Gets Boost From Steel Products Advisory Committee

Washington

• • • **The voluntary** allocations program received a shot in the arm Nov. 19 when the Steel Products Advisory Committee, completely reversing its earlier position, approved the continuation beyond Feb. 28, 1949, of five voluntary plans calling for the monthly allocation of a total of 347,100 tons of steel products.

At its Oct. 6 meeting with the Dept. of Commerce, the committee refused to consider the extension of any plans except those calling for steel for defense needs. At that time it approved extension of programs calling for a total of 129,775 tons monthly for the Armed Services, Atomic Energy Commission, and the National Advisory Committee for Aeronautics.

In addition, the committee at the Nov. 19 meeting approved one new voluntary plan and recommended the development by the Office of Industry Cooperation of voluntary allocations programs for four new projects.

The five voluntary programs approved by the committee for extension for a 6-month period beyond Feb. 28, 1949, are:

(1) Construction and repair of oil tankers, 40,380 tons of steel products monthly, which is at the present rate.

(2) Construction and repair of merchant vessels, 15,190 tons of steel products monthly, an increase of 5,000 tons monthly above the present rate.

(3) Construction and repair of inland waterway barges, 25,000 tons of steel products monthly, an increase of 5000 tons per month above the present rate.

(4) Repair and construction of freight cars, up to 250,000 tons of steel products monthly to meet the present 10,000-car-per-month production goal.

(5) Oil field tank and production equipment, 16,530 tons of steel products monthly, which is at the present rate.

In addition, the steel committee approved a proposed plan which would make 26,000 tons of steel products available monthly for the manufacture of mining machinery, to become effective during February, 1949. It was agreed that the quantity of steel involved in this program might be increased later, following further study and review of the mining machinery industry steel supply situation.

A relatively small tonnage of steel for the construction of ore-carrying cars to transport a strategic material in an undisclosed foreign country for eventual transportation to U. S. stockpiles was also pledged by the committee.

A similar recommendation was made to develop a program to provide steel sheets for the construction of grain storage bins.

The committee recommended that a program to provide steel for terminal and bulk oil tank storage be developed by OIC. This proposed program will be resubmitted for consideration at the next meeting with the Steel Products Advisory Committee.

The proposed program to provide pipe for the East Tennessee Natural Gas Pipeline Co. was referred back to the Office of Industry Cooperation for further study and review. The committee indicated that it would underwrite the requirements for this project when problems of a technical nature have been solved.

The committee also requested OIC to develop a program for allocation of steel products to the bituminous coal mining industry.

Coming Events

Nov. 28-Dec. 3 American Society of Mechanical Engineers, annual meeting, New York.
Nov. 29-Dec. 4 National Exposition of Power & Mechanical Engineering, New York.
Dec. 2-4 Society for Experimental Stress Analysis, annual meeting, New York.
Dec. 2-4 American Institute of Mining & Metallurgical Engineers, annual electric furnace steel conference, Pittsburgh.
Dec. 2-4 American Metallizing Contractors Assn., annual meeting, Tulsa, Okla.
Dec. 3 Magnesium Assn. and Mellon Institute, magnesium meeting, Pittsburgh.
Dec. 6-8 Electric Welding Conference, Detroit.

1949

Jan. 10-14 Society of Automotive Engineers, annual meeting, Detroit.
Jan. 10-14 Material Handling Institute and American Society of Mechanical Engineers, Materials Handling Show, Philadelphia.
Jan. 14 Malleable Founders' Society, semiannual meeting, Cleveland.
Jan. 24-28 American Society of Heating & Ventilating Engineers, annual meeting, Chicago.

Battle Over Legality Of a Delivered Price System on at Capitol

Washington

• • • **The battle on** Capitol Hill over the legality of delivered price systems officially got under way last week.

For the past 6 months, a Senate Commerce subcommittee headed by Senator Capehart, R., Ind., has been waging a steadily stronger campaign in favor of delivered price systems. The opposition, under the aegis of the Federal Trade Commission, said little but began to dig in for the coming congressional battle.

Now the fat is in the fire. Representative Patman, D., Texas, sounded the keynote of the argument to be used by Capitol Hill proponents of f.o.b. pricing when he told THE IRON AGE: "The proceeding of the Capehart subcommittee is nothing but deceitful propaganda. It is a frontal attack on the nation's antitrust laws."

Senator Capehart, meanwhile, not to be outdone, asserted that the FTC's role should be one of helping, not hurting business men. When Walter B. Wooden, associate general counsel of the FTC, hinted darkly in testimony that "there are some people who want to weaken the antitrust laws," Mr. Capehart accused him

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of "bias and prejudice," and declared that such a statement rendered him "unfit to sit as counsel for the FTC." "You're there to serve big business as well as little business," he stated.

Meanwhile, a parade of witnesses representing the metalworking industry continued to present views to the Capehart subcommittee. Among these was J. K. Beeson, Pittsburgh Steel Co. vice president, who told the subcommittee that because of the elimination of freight absorption by his company, Pittsburgh's customers as a whole were compelled to pay approximately $500,000 more for their products.

"While the present practice of selling on an f.o.b. mill basis gives us a temporary addition to our aggregate selling prices of approximately $500,000 a year, it is obvious to us that this is only temporary and that, in the long run, such practice will result in a substantial reduction in our operations and the possible elimination of profit on our operations.

"Instead of increasing competition," Mr. Beeson predicted, "the system will eventually lead to a restriction of competition, and we seek the legal right to sell our product competitively in a broader rather than restricted area."

Joseph L. Block, Inland Steel Co. vice president, told Senator Capehart that "the statute you enact should make it quite definite that the seller can be competitive constantly and that he need have no fear of prosecution for conspiracy merely as a result of identical prices or 'systematic freight absorption' in the absence of evidence of collusive action." He said he also favored a legislative definition of "price" in such a statute.

R. L. Gray, Sheffield Steel Corp. president, charged that the FTC has adopted definitions of "price" which Congress had repeatedly refused to do. "If the heavy industry of this country is to be socialized," he declared, "let's do it with our eyes open and not through the indirection of arbitrary rulings which impose conditions upon industry which first drive it into an unsound economic position from which socialization must be the result."

Canadian Steel Production and Shipments

Toronto

• • • **Canadian production of primary iron and steel shapes for the month of August totaled 272,202 net tons, as compared with 276,250 tons in July and 244,601 tons in August 1947. Output for August included 262,790 tons of carbon steel shapes and 9412 tons of alloy steel shapes. In the production figures for August are included 70,955 tons of shapes shipped to producers own plants or plants within the primary industry for further processing.**

Shipments for sale of primary iron and steel shapes in August amounted to 195,105 net tons of which 185,188 tons were carbon steel shapes and 9917 tons alloy steel shapes; in July shipments totaled 206,243 tons and included 197,066 tons of carbon and 9177 tons of alloy steel shapes, and for August 1947 shipments amounted to 182,324 tons including 172,301 tons of carbon and 10,023 tons of alloy steel shapes. The above figures which show iron and steel shapes for sale, do not include deliveries for further processing.

The following table shows production and shipments for sale of primary iron and steel shapes for the month of August in net tons:

August, 1948	Carbon Steel		Alloy Steel	
	Made	Shipped	Made	Shipped
Billets, etc. for forging	9,311	3,288	2,106	2,045
Other semifinished shapes, not for rerolling by makers	44,398	3	239	
Structural shapes and piling	11,661	11,067		
Plates	18,486	17,928	179	159
Rails	22,762	24,701		
Tie plates and track material—				
Splice bars	1,160	1,282		
Tie plates	1,237	1,180		
Spikes	968	996		
Concrete reinforcing bars	6,752	5,588		
Hot-rolled bars for cold finishing	1,703			
Other hot-rolled bars	31,964	32,309	4,712	5,613
Pipes and tubes	10,627	9,973		
Wire rods	24,494	24,360	40	35
Hot-rolled black sheets	22,188	15,602		
Cold reduced black sheets	2,905	2,655		
Galvanized sheets	8,218	7,218		
Steel castings	7,181	7,380	1,486	1,398
Miscellaneous hot-rolled products	21,450	4,185	344	344
All other products	15,325	15,473	306	323
TOTAL	262,790	185,188	9,412	9,917

Producers' shipments of primary iron and steel shapes subdivided according to principal consuming industries for the month of August, in net tons, follow:

Industry	Carbon Steel	Alloy Steel
Automotive industries	7,159	3,437
Agricultural, including farm machinery	6,999	451
Building construction	20,604	172
Containers industry	15,620	3
Machinery and tools	9,841	991
Merchant trade products	33,448	295
Mining, lumbering, etc.	6,514	394
National defense	14	4
Pressing, forming and stamping	8,925	60
Public works and utilities	1,364	13
Railway operating	16,445	254
Railway cars and locomotives	15,555	98
Shipbuilding	3,980	86
Miscellaneous and unclassified	835	132
Wholesalers and warehouses	20,395	266
Direct export—(a) to British Empire	16,509	1,839
—(b) to other countries	981	1,422
TOTAL SHIPPED FOR SALE	185,188	9,917
Producers' interchange	70,955	239

Construction Steel . . .

• • • Fabricated steel awards this week included the following:

1070 Tons, Louise, Ariz., U. S. Bureau of Reclamation Specification 2431 Davis power plant to Virginia Bridge Co., Roanoke, Va.

1000 Tons, Lancaster, Pa., building for Armstrong Cork Co., to Lehigh Structural Steel Co., Allentown, Pa.

820 Tons, Middlesex Co., N. J., bridge on Route 4, through Brann & Stuart Co., Philadelphia, to Bethlehem Steel Co., Inc., Bethlehem.

275 Tons, Nitro, W. Va., building for American Viscose Co., to Bethlehem Steel Co., Inc., Bethlehem.

260 Tons, Flushing, N. Y., 3 store buildings, Fresh Meadows, to Grand Iron Works, Inc., New York.

250 Tons, Milwaukee, theatre building through the Dome Realty Co. to Wisconsin Bridge & Iron Co., Milwaukee.

240 Tons, Ivorydale, Ohio, Proctor & Gamble Co., through Day & Zimmerman, Philadelphia, to Bethlehem Steel Co., Inc., Bethlehem.

235 Tons, Coram, Mont., outlet for the Hungry Horse Reservoir, U. S. Bureau of Reclamation Specification 2450 to Keyes Tank & Supply Co., Caspar, Wyo.

230 Tons, Schuylkill Co., Pa., bridge, through Mahlon Livengood, to Bethlehem Steel Co., Inc., Bethlehem.

• • • Fabricated steel inquiries this week included the following:

340 Tons, Multnomah Co., Ore., bridge Columbia River Highway, Public Roads Administration, Portland, bids to Nov. 30.

200 Tons, Wernersville, Pa., Wernersville State Hospital, due Dec. 1.

200 Tons, Warren, Pa., building for Warren State Hospital, due Dec. 1.

110 Tons, Lawrence Co., Pa., bridge, Pennsylvania Dept. of Highways, due Dec. 3.

• • • Reinforcing bar awards this week included the following:

1200 Tons, Allentown, Pa., filtration plant, Bass Engineering Co., Birmingham, Mich., low bidder.

600 Tons, Palm Beach, Fla., tuberculosis sanitarium for the State of Florida through Arnold Construction Co., Palm Beach, Fla., to Connors Steel Co., Birmingham.

440 Tons, Philadelphia, elementary school, Princeton & Hawthorne Sts., to McCloskey & Co., Philadelphia.

350 Tons, Philadelphia, elementary school, Sedgwick & Williams Sts., to Wark & Co., Philadelphia.

270 Tons, Kankakee, Ill., Kankakee, Ill., acute hospital for the State of Illinois, W. E. O'Neill Construction Co. previously reported low bidder. The job has been awarded through W. E. O'Neill Construction Co. to Truscon Steel Co., Cleveland.

240 Tons, Chicago, building for F. W. Woolworth Co. to Turner Construction Co., Chicago.

160 Tons, Tallassee, Ala., building for Tallassee Mills, to Connors Steel Co., Birmingham.

105 Tons, Cicero, Ill., St. Francis of Rome school building previously reported awarded to Van Etten Bros., bars will be supplied by J. T. Ryerson & Son, Chicago.

• • • Reinforcing bar inquiries this week included the following:

1800 Tons, Wilmington, Del., memorial bridge —3rd contract, due Nov. 30.

350 Tons, Philadelphia, school, 57th & Wynnefield Sts., due Dec. 6.

150 Tons, Beloit, Wis., high school building, bids close Dec. 12.

100 Tons, Wildwood, N. J., Grassy Sound Bridge, due Nov. 30.

50 YEARS AGO

THE IRON AGE, *November 23, 1898*

• "In 1849 when Mr. Corliss received a patent covering his engine, considerable resistance was encountered in the commercial use of so new an engine. After much negotiating, an agreement was made with a New England mill whereby he would receive for it only the value that was realized in fuel saving. This compensation was so great that the mill soon sought a compromise which netted Mr. Corliss a profit far in excess of what he would have accepted in a direct sale."

• **"The Cincinnati Planer Co. is the name of a new machine tool concern which will begin operations Jan. 1, 1899. They will make planers ranging from 24 to 60 in. and will employ 50 men. A number of good contracts from abroad and domestic sources have already been booked and the company will start off with flattering prospects."**

• "No one will pretend that we ought to allow the Filipinos the latitude of a territorial government. The islands are peopled by an alien race which cannot be expected for a century to rise sufficiently to the standard of our institutions to become an integral part of the Union. We must therefore administer the country as a colony or dependency, and for years to come, place it under a military rule."

• **"The marked decrease in the bicycle business is being felt to a great extent by several builders of special machine tools for bicycle manufacturers. The number of concerns who ventured into the manufacture of bicycles and proved unsuccessful is large. Consequently, there is a great amount of this special machinery on second hand lists which is as good as new."**

• "A prominent shipbuilding company reports that as a result of 3 years of constant experimenting which were caused by the unreasonable demands and constant strikes of their riveters, it is now able to drive every rivet by power machines. As a result, skilled labor, which has hitherto been indispensable and correspondingly arrogant and high-handed, can be replaced by unskilled labor."

Chester Furnace

(CONTINUED FROM PAGE 133)

whether this furnace will be able to continue to operate in a competitive market. Most of those in a position to gage the merchant iron market sadly shake their heads and observe that there is no reason that the furnace should be in any better position to meet a competitive market than other, larger merchant furnaces. Operating costs probably will continue to be higher at this small furnace which is designed to operate on foreign ores than for other merchant furnaces. Operating men point out, however, that natural gas is coming into the Philadelphia district in larger volume. This may eventually permit the furnace to purchase good byproduct coke from the Philadelphia Gas & Electric Co. and sell its producer gas to them.

Rehabilitation work at Chester is going on under the management of Carl F. Schaber, a Brassert man. When it goes into production, Brassert will operate the furnace through James Gaugler as operating superintendent, a former Carnegie-Illinois blast furnace man.

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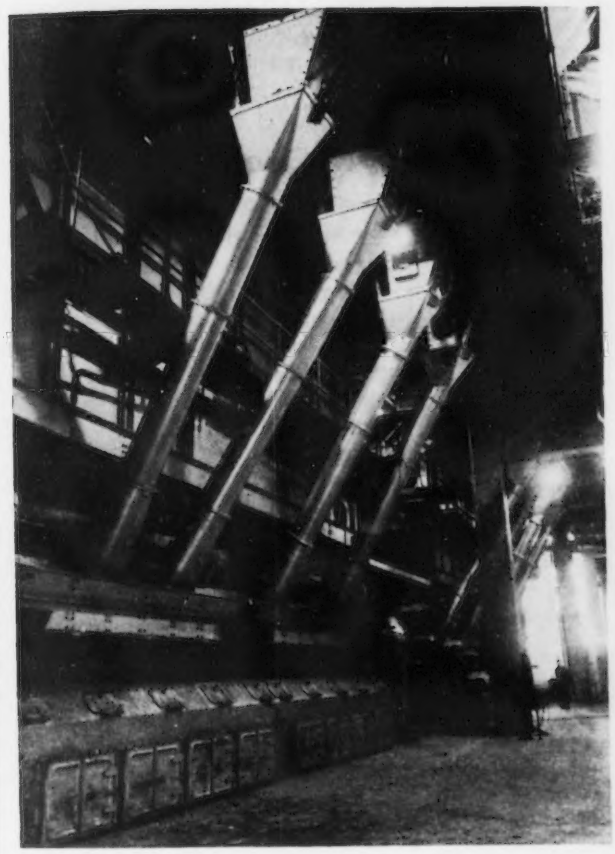
Kingston Power Station Part Of Britain's $1.8 Billion Electrification Plan

Recently the King and Queen visited an open house program at the new Kingston-On-Thames power station which is the first of 31 such generating stations that Britain will build at a cost of about $1.8 billion.



The boiler house produces 265,000 lb of steam per hr with a working pressure of 650 lb per sq. in. at a temperature of 850° F. Power output runs about 120,000 kw.

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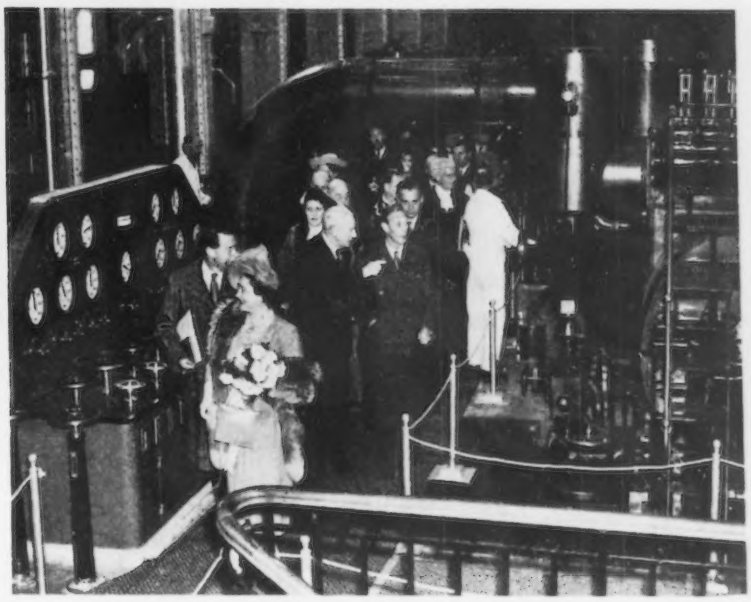
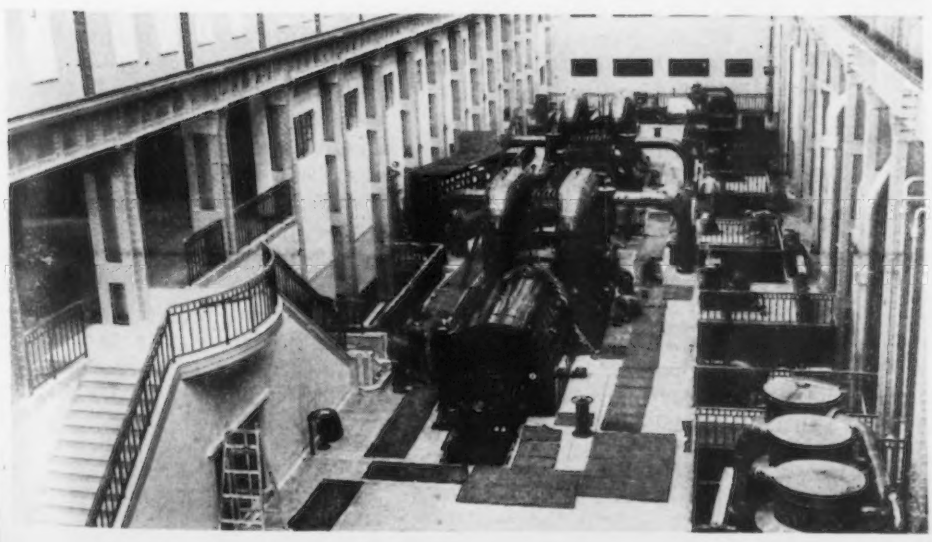




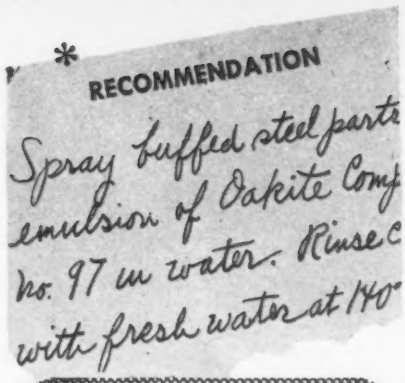
ABOVE

Here the King and Queen are shown passing the control panel beside one of the large turbines. This plant in itself was constructed at a cost of approximately $80 million.

o o o

LEFT

The area contains giant turbo-alterators which produce 30,000 kw each. It is large enough to house streets of homes on top of each other.



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Argentina's 5-Year Plan Slowed by Dollar Famine

Birmingham

• • • **Argentina's** 5-year plan is being momentarily slowed down by a dollar shortage, according to General Juan A. Pistarini, general of the army and minister of public works of the Argentine Republic. The General and his party made an official visit to the United States in September and October.

The official visit by the Argentine minister of public works had as its purpose the inspection of U. S. shipyards and factories, flood control projects and transportation facilities.

The minister explained that Argentina is open to any solution to her present problems which would put her near to the United States economically. He also stated that his country stands solidly behind the United States in the cold war against Soviet Russia. It is General Pistarini's belief that the United States should guide the world.

A partial itinerary of the tour of the United States by General Pistarini included The Ingalls Shipbuilding Corp.'s shipyards at Pascagoula, Miss. and Decatur, Ala.; experimental station of Mississippi River Commission at Vicksburg, Miss.; dredging operations of Corps of Engineers, U. S. Army, at mouth of Mississippi River; Higgins Industries in New Orleans; The Ingalls Iron Works Co. and Tennessee Coal, Iron and Railroad Co. in Birmingham, Ala.; Tennessee Valley Authority area; Smoky Mountain National Forest; Dravo Corp. plant at Pittsburgh; Ellicott Machine Co. in Baltimore; Moisant International Airport, New Orleans; Army Air Force Training Base at Keesler Field, Biloxi, Miss.; National Airport, Washington, D. C., and LaGuardia and Idlewild Airports, New York.

While in Birmingham, the General expressed his opinion that the United States was the ideal place in which to buy much of the floating equipment and machinery for his country's 5-year plan.

The South American country has already placed contracts for more than $25 million worth of floating equipment for river and harbor improvements alone. Argentina expects to spend more than $500 million on its 5-year program.

The General revealed that because of the dollar shortage, Great Britain and Italy had been favored thus far. Argentina has seemingly unlimited funds in terms of British pounds. This scarcity of American dollars, however, has not stopped General Pistarini from placing contracts in this country for the purchase of equipment.

Hartford Exhibits Slated To Operate Under Power

Hartford, Conn.

• • • **A machine tool,** welding and metalworking equipment show that will exhibit equipment of national manufacturers, will be held in the Hartford Times Radio Center Bldg., Dec. 6 to 10, 1948. The show, held under the auspices of the Austin-Hastings Co., Inc., of Cambridge, Mass., will have all equipment exhibited under power and in operation.

Included in the show will be machine tools built by Rockford Machine, Mattison Grinder, Fosdick, DeVlieg Machine, Taft-Pierce; welding equipment by Westinghouse, Hobart Bros., Miller Electric, Victor Equipment, Sight Feed Generator, Alloy Rod-Handy and Harman; and metalworking machinery built by Chicago Steel Press, Wallace, and Wiedemann. Hydraulic Press Mfg. Co. will exhibit a 125 ton plastic injection molding machine, a die casting machine, and a 20 ton laboratory press.

Acquires New Facilities

Detroit

• • • **Wyandotte** Chemicals Corp. has acquired the manufacturing facilities and clay deposits of Blue Mountain Clay Co., Inc., of Mississippi.

The new facilities will be used to produce Wyandotte Zorball, a claylike mineral with oil and water absorbent properties, according to a spokesman for the company.

Zorball is reported to have unusually low content of calcium and magnesium oxides. This product may be used to protect against fires in combustible wastes and is said not to turn to a slippery mud in oil or when completely saturated with water.

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More Workers Qualify For National Steel's Retirement Program

Weirton, W. Va.

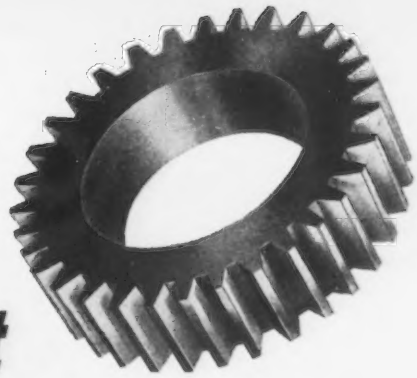
• • • **The names of 524** employees of Weirton Steel Co. and Weirton Coal Co., now eligible to join the National Steel retirement annuity plan, were announced in the November edition of the Weirton Employees Bulletin. The Plan provides pension benefits for its members after they have reached 65 years of age, regardless of whether or not they continue working. It has a membership of over 5100 contributing members at the present time.

About 70 Weirton members of the plan will retire this year and start to draw annuity checks for the rest of their lives. In Weirton and Isabella 253 "old timers" are receiving pension checks.

The Pension Plan was amended Jan. 1, 1944, to permit any employee, who was at least 30 years old, had not reached his 65th birthday, and had credited service with the company of not less than 5 years, to become a member of the plan. It is only possible now to join the plan the first year after an employee has qualified in age and years of service.

Each year, those who become eligible are notified by the annuity department and given an opportunity to join. If an employee decides not to join when he first becomes eligible, he is permanently disqualified from joining later.

The company pays in about $2 to every $1 paid by the individual employee. Take the case of an employee who reaches age 65, has been a member of the plan for 30 years, and had earnings which averaged $225 a month during that 30-year period. Such an employee would start receiving a check of $63 a month for the rest of his life, whether he quit work at age 65 or not. This employee would have contributed $84 a year for 30 years adding up to a total investment of $2520. The return of this investment is $63 a month or $756 a year. At this rate, his total contribution would be paid back in exactly 3½ years. This payment of $63 a month does not stop when the employee has all his money back, but continues as long as the employee lives.



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Scientists Blow Soap Bubbles to Learn What Makes Metals Strong

Rochester, N. Y.

• • • **Scientists have** resorted to blowing soap bubbles in an effort to find out what makes metals strong, Sir Lawrence Bragg of Cambridge University, England, Nobel Prize winner in physics in 1915, reported in an address at a joint meeting of the Rochester Sections of the American Chemical Society and the Optical Society of America.

Soap bubbles, Sir Lawrence explained, have proved more useful than anything else tried so far in constructing a workng model of the crystal structure of a metal. A cluster of bubbles, he said, behaves much like the cluster of atoms making up a metal crystal, and lasts "an hour or so," which is long enough to permit experiments.

The bubble-blowing studies were undertaken because science as yet has no satisfactory theory of metal strength, despite the enormous amount of empirical knowledge about the mechanical properties of metal, which has been obtained through countless investigations of the metals and alloys so important in modern technology.

"On the theoretical side, we know the way atoms are arranged in the perfect structure of metal crystals, and the theoretical physicists can tell us much about the forces of attraction and repulsion which keep these structures together," he stated. "There is no bridge, however, between theory and the empirical knowledge of mechanical properties. We cannot calculate from first principles the point at which a metal ceases to respond elastically and yields with consequent permanent deformation."

The electric limit of metals is raised when they are "cold-worked," and also when a pure metal is alloyed with small proportions of other elements, he said, and this increase in strength apparently develops because the easy gliding of close-packed rows of atoms over one another is prevented by the cold work or the impurities. At present, however,

UNIVERSITY OF MICHIGAN LIBRARIES

there is no known way of expressing this relationship precisely.

The bubble model is composed of a mass of minute bubbles formed by blowing air from a fine jet under the surface of a soap solution. The bubbles, remarkably uniform in size can be produced in enormous numbers at the rate of a thousand or more a second, so that enough of them to represent a relatively large crystal can be accumulated speedily, Sir Lawrence reported, adding that "they crystallize beautifully in a close-packed form." A range of sizes between two millimeters and one-tenth millimeter is used.

"**In a qualitative** way, the most attractive feature of these bubbles is that they slip or glide along close-packed rows just as a metal does. It has long been suspected that, in a metal, slip does not take place by one whole row or sheet of atoms jumping simultaneously over the row or sheet below: it takes place by a 'dislocation' starting at one end and running across, so that the final result is that all the atoms in the top row 'move on one place' as compared with those below.

"This is exactly what the bubbles did, but they show other interesting properties as well. If we stir up a sheet of these bubbles, it is like cold-working a metal—they are broken into a mass of small crystals and one can watch crystal growth take place. Some of the crystals grow at the expense of others, and become larger. Then again, one can introduce a few bubbles of the wrong size and so study the effect of atoms of impurity.

"One can study places where the structure is faulty because several bubbles are missing, and these faults have very interesting features which indicate that they may play a large part in diffusion and other changes in atomic position within the metal."

Five-Day Seminar Planned

New York

• • • **A private** 5-day seminar on the organization and technique of standardization work, particularly in individual companies, will be held from Jan. 24 through Jan. 28, 1949, in Room 503, Engineering Societies Building, 29 West 39th Street, New York City, by Dr. John Gaillard.

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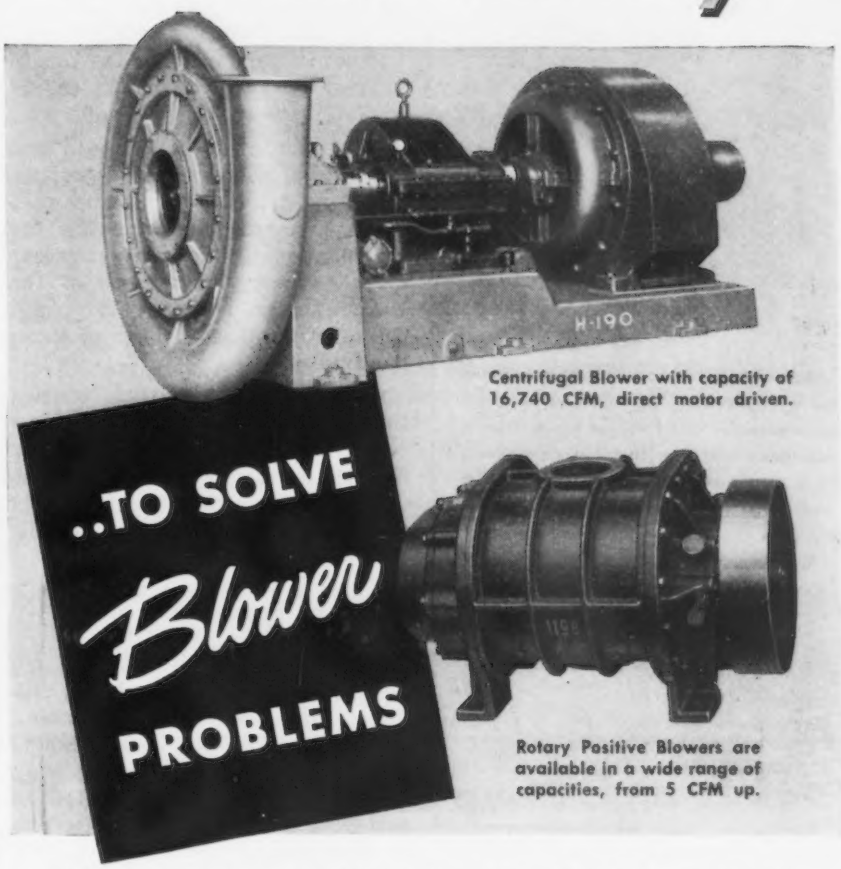

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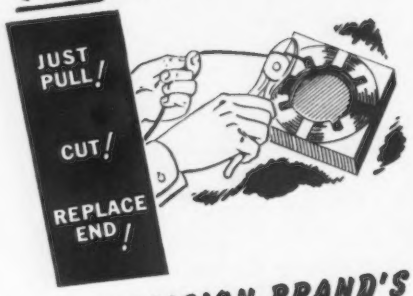

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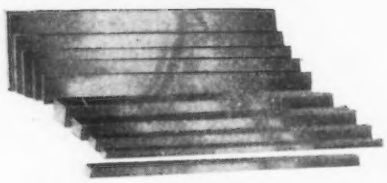

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OIT Sets Fourth Quarter Aluminum Export Quota

Washington

• • • **An export quota** of 8500 tons of aluminum sheet, plate, and strip has been established for the fourth quarter of 1948, according to the Office of International Trade.

Aluminum sheets, plates, and strips were added to OIT's positive list on Aug. 25, 1948, and since that time have required licenses for shipment to any destination except Canada. For the balance of the third quarter, however, no overall ceiling was set on exports of these commodities.

Sufficient time has now elapsed to allow importing nations to provide OIT with statements of their aluminum requirements, and for OIT to evaluate these requirements against available supplies.

New Insulation in Lamps

Pittsburgh

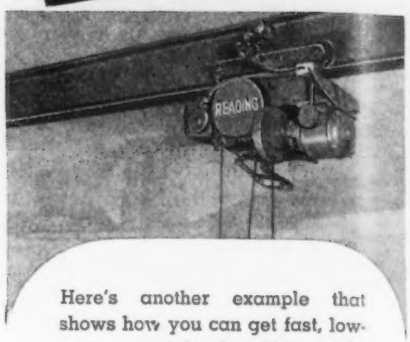
• • • **Fiberglas cloth** is being employed as a series cutout between the lead-in wires inside lamps used on the New York subway where 20 lamps are operated in series on a 600 v d-c circuit. The nominal operating voltage of each lamp is 30 v.

By inserting the Fiberglas between the lead-in wires in the Westinghouse gas-filled lamps, the necessary critical spacing is maintained. A strap of nickel around the wires holds them tight against the Fiberglas.

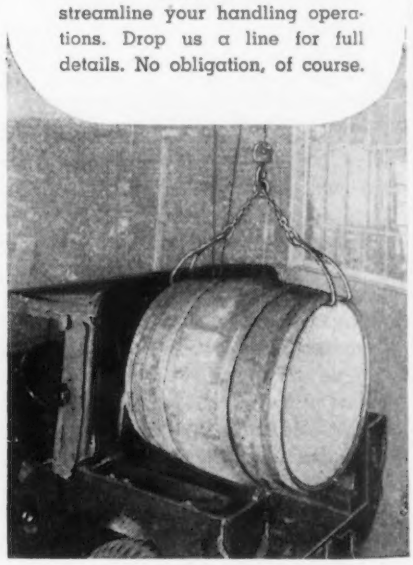
When the filament in any of the twenty lamps fails, the series circuit is momentarily broken and a potential of 600 v is impressed across the lead-in wires of the failed lamp. An immediate insulation breakdown occurs through the interstices of the Fiberglas as the gas acts as a conductor. The result is a fusing together of the wires to maintain the series circuit. The cutout will operate without failure at 200 volts when sealed in the lamp at 500 volts in the open air.

By means of a quality control test devised by Westinghouse engineers, it is possible to check the breakdown characteristics of this type of cutout before it is sealed into the lamp without destroying its usefulness.

HOW ONE PLANT Streamlines MATERIAL HANDLING



Here's another example that shows how you can get fast, low-cost materials handling, right now. Before installing a *Reading* engineered system, this plant had to wheel heavy barrels to the mill via hand trucks. To streamline the operation, *Reading* Engineers were called in. A one-ton Reading Electric Hoist, operating on a built-in parallel trolley, was recommended. Now barrels move faster—less manpower is tied up—and the entire operation costs far less!
Let Reading Engineers give you *practical* suggestions that can streamline your handling operations. Drop us a line for full details. No obligation, of course.



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Fourth Quarter Export Quotas of Steel Mill Products Are Released

Washington

• • • **Export quotas** for steel mill products covered by quantity limitations, as set by the Office of International Trade, will approximate a total of slightly more than a million tons for the fourth quarter 1948.

These fourth quarter quotas include all presently approved requirements of special projects abroad which are considered of vital interest to the United States. Mill products quotas for the last quarter, by commodity and tonnage, are as follows:

Non-alloy ingots, 20,500; billets, blooms and slabs, 32,500; sheet and tinplate bars, 1000; alloy (including stainless) ingots, 500; billets, blooms and slabs, 4500; steel bars, cold-finished, including nonalloy, and alloy, except stainless, 17,000; concrete reinforcement bars (deformed and twisted bars only), 35,000; iron bars, other steel bars and rods (hot rolled) containing no alloy, 125,000*; other steel bars and rods (hot rolled) alloy steel, except stainless, 17,000; wire rods, except specialty steel, 10,500; boiler plate, other plates, except fabricated (hot and cold rolled included) containing no alloy, 90,000; other plates, except fabricated (hot and cold rolled included) alloy steel, except stainless, 1500; skelp iron and steel, 500.

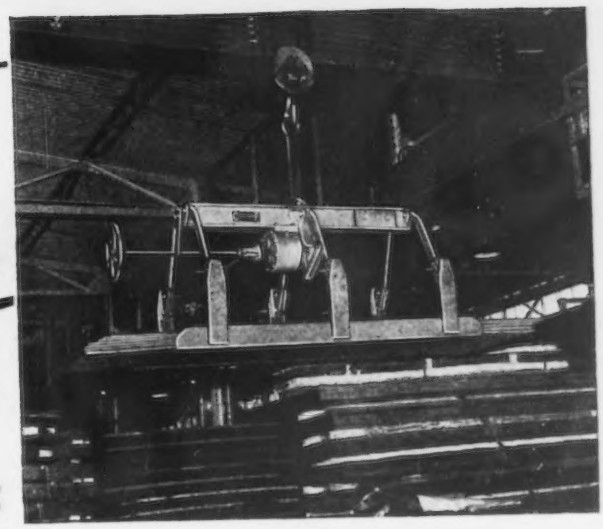
Iron sheets, galvanized, steel sheets, galvanized, 15,000; steel sheets, black, ungalvanized (hot and cold rolled included) containing no alloy, iron sheets, black, 84,000; steel sheets, black, ungalvanized (hot and cold rolled included) alloy, except stainless, 14,000; iron and steel strip, cold rolled, containing no alloy, iron and steel hoop, band, and scroll, cold rolled, containing no alloy, iron and steel strip, hot rolled, containing no alloy, iron and steel hoop, band, and scroll, hot rolled, containing no alloy, 30,000.

Water, oil, gas, and other unlined storage tanks, **complete and knockdown** material for temporary or permanent installation, n.e.s., 35,000; structural shapes, except fabricated, 64,000; structural shapes, fabricated, except prefabricated houses, 51,000; penstock, 5000; plates, fabricated, punched, or shaped, n.e.s., 7000; sheet piling, 9800; rails, 60 lb and over per yd, 60,000; rails, under 60 lb per yd, 6500; relaying rails, 20,000; rail joints, splice bars, fishplates and tie plates, 18,500.

Boiler tubes, iron and steel: seamless, welded, 13,000; casing and oil-line pipe: seamless, 70,000; welded, 37,000; seamless black pipe, except casing, oil-line and boiler, 9000; malleable iron screwed pipe fittings, 150-lb. pressure and under, floor drains, cast iron; and the following iron and steel pipe fittings, when 150-lbs. pressure and under: couplings; galvanized pipe fittings, malleable iron pipe fittings; pipe joints, gray iron, extension; pipe nipples, lap-welded, black; pipe plugs; pipe unions; screw elbows; swage nipples, 5300; cast iron pressure pipe, pipe fittings, 12,000; welded black pipe, steel, 18,000; welded black pipe, wrought iron, welded galvanized pipe, wrought iron, 3000; welded galvanized pipe, steel, 14,000; iron and steel pipe, n.e.s., 14,700; iron and steel wire, uncoated, 17,500; galvanized wire, 17,500; barbed wire, 12,500; woven-wire fencing, 4000; wire cable and rope, except insulated, 6900; baling wire, black, annealed; coils, cold finished; musical instrument wire; piano wire; spring wire, bright steel, for musical instruments, 2000.

Wire nails (including wire shoe nails), nails: asbestos shingler; cut (including cut shoe nails); roofing, lead-headed; shingle; siding, zinc-coated; smooth flat head, cement-coated, 7000; castings and forgings, iron and steel: railway car wheels, except locomotive; railway car axles, without wheels, except locomotive; railway car axles, fitted with wheels, except locomotive, 8000**; iron and steel forgings, n.e.s. (except railway car wheels, tires, and axles, and horseshoes and mule shoes):

Save TIME Save SHEETS



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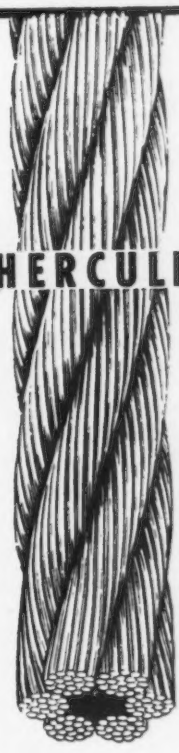

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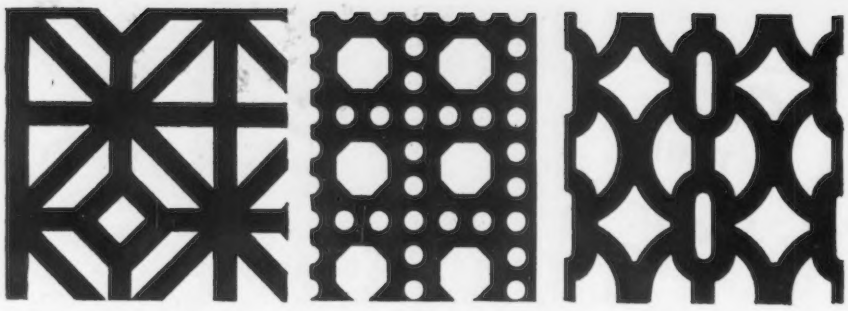

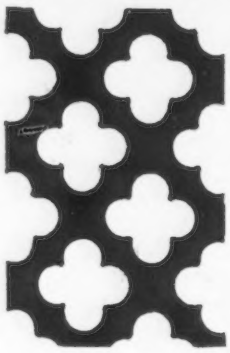

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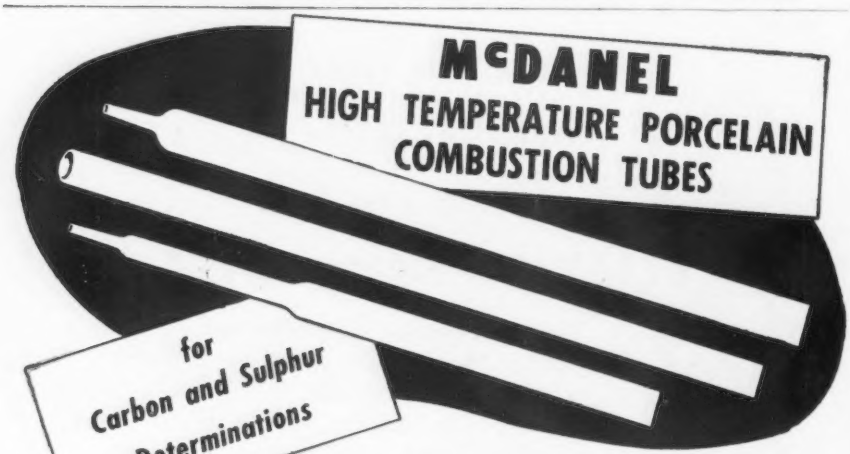

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containing no alloy, alloy steel (stainless included) 9,000; surplus iron and steel, 15,000***.

NOTE:

* Not more than 40 pct may be licensed in sizes one in. and under; also, not more than 20,000 short tons may be licensed for tube rounds.

** Provided that no more than 2000 short tons is for steel wheels and axles, and at least 700 tons are used materials.

*** A fourth quarter 1948 quota of 15,000 short tons has been established for surplus iron and steel, irrespective of Schedule B classification, provided that any export quota herein announced may not be increased by more than 15 pct as a result of approvals of licenses for the same product as surplus iron and steel, and that not more than 25 pct of the 15,000 short tons may be licensed against any one quota of iron and steel products.

Bituminous Coal Research Has Opened Branch Office

Pittsburgh

• • • **To maintain** close contact with expanding research activities and to expedite the application by industry of the research being conducted by the bituminous coal industry's research organization, Bituminous Coal Research, Inc., on Nov. 1, opened a branch office at 488 West Sixth Ave., Columbus, Ohio.

The Columbus office, in charge of Elmer R. Kaiser, assistant director of research, will provide Battelle Memorial Institute with closer sponsor contacts on BCR projects on which approximately half of the BCR budget is spent. The office will be within three blocks of the institute's main building.

Assisting in the second important phase of the work, James R. Garvey, development engineer, will be active on the commercial development of smokeless residential heating equipment in cooperation with manufacturers. Smokeless stoves, a cooking range, warm air furnaces, heating boilers, and a stoker-boiler are among these products.

Says Pegged Currencies Hampering World Trade

San Francisco

• • • **Wildcat currencies** are throttling international trade, according to James D. Mooney, president and board chairman of Willys-Overland Motors.

Speaking before the Commonwealth Club, the automotive executive asserted that current difficulties in world trade are the result of "pegged currencies and artificial restrictions that keep the world's currencies from finding a realistic relationship—first to gold

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and second to each other in terms of gold and of world prices for commodities."

Mooney vigorously denied that the big obstacle to increasing America's foreign trade is the international dollar shortage, as maintained by some observers.

"The so-called dollar shortage," he declared, "is really only a nice-sounding name to hide the fact that paper currencies are not worth what they once were, either in internal or foreign purchasing power.

"All of the foreign paper currencies are in disrepute even with their own nationals because they are known to bear a false, or at least unknown, relationship to gold."

Steel Co. of Canada Stresses Demand And Shortage of Scrap

Toronto

• • • **Demand for** all products produced by the Steel Co. of Canada, Ltd., continues well in excess of supply with no indications of improvement, according to a company report. During the first 9 months of this year sales were 29 pct greater than for the same period of 1947, due to the larger tonnage sold and higher prices necessitated by increased costs, the company reports.

The problem of securing supplies of scrap adequate to maintain the present high level of steel production in Canada gives cause for grave concern and the absolute necessity of getting all available scrap moving to the mills is being stressed.

"In view of the high proportion of Canada's steel production which was exported during the war for combat needs, it is hoped that some reasonable proportion of the scrap being exported from Germany may be allocated to this country by the United States and British occupation authorities," the company says. Otherwise, the threat of curtailment of steel production because of scrap shortage may become most serious.

The company's program of plant expansion continues to absorb important amounts of new capital. For the first 9 months this year these expenditures reached almost $10.5 million and a further amount of $9 million will be needed.

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GENERAL ELECTRIC

MACHINE TOOLS

. . . News and Market Activities

Sales Volume Decline Indicates Possible Planning Readjustment

• • • **Release of** funds by France for purchase of machine tools and repair parts, and a seasonal but apparently rather limited cleanup of appropriation money by domestic customers in various sales sectors was under way this week, providing an otherwise bleak machine tool market with a few bright spots.

France released $5 million for machine tools and repair parts, of which a reported $2,600,000 will be spent in this country, with the balance going to the British. Trade sources were quick to seize upon this as fragmentary but important evidence that the bottleneck in ECA machine tool business has been broken.

On the other hand, the East Coast longshoremen's strike is holding up machine tool shipments abroad, and the problem of demurrage is rearing its ugly and expensive head between machine tool builder and buyer.

The current decline in sales volume in the machine tool industry has prompted some observers to remark that the industry is in for a period of amalgamations, mergers, and radical planning readjustments. Some of this has been seen already.

In Detroit machine tool volume continues far below the levels of the past few years. Builders of specialized equipment in particular are very hard hit. No major tooling programs are in sight here and a recent postponement of the introduction of an automatic transmission for one of the independent car producers has snuffed out, temporarily at least, one of the more promising programs.

Meanwhile, Chevrolet is moving forward, it is reported, with the tooling of its Saginaw plant. Informed sources here now believe Chevrolet may be in a position to offer the car buyer an automatic transmission by midsummer 1949. Present indications now are that any Ford transmission will lag considerably behind this.

Longshoremen's Strike Causes Demurrage To Pile Up On Shipments For Abroad

o o o

Limited ordering by tool shops continues according to some segments of the industry. Expiration of leases on equipment has stirred up some activity here within recent weeks. In some cases, however, the needs are being filled by transfers of machines; others are buying used equipment. It is expected, however, that a sizable volume of orders will eventually result from the present inquiries.

Sellers of machine tools in the Chicago area will consider themselves lucky if their volume for 1948 is equal to last year. For the first 9 months of this year they were ahead, but fourth quarter business has been very poor. They recall that fourth quarter sales last year were terrific.

Deliveries of standard tools can be made in many cases from stock. At times the buyer waits from 3 to 4 weeks, but seldom does he have to wait any longer. Some deliveries remain tight on special equipment. Heavy duty presses show a sizable backlog. Scrap baling presses are being quoted on an 18-month delivery basis by some makers in this area.

The tool program for Deere & Co. in Des Moines has about been completed. This program amounted to almost $1 million and was placed about a year ago. Lately this company has placed some small orders to round out their facilities.

Tool and die shops in this area are next to dead. Machine toolmakers are enthusiastic over the approach the ordnance engineers are employing in their phase on defense planning. These men in laying out tentative plans are not figuring on using obsolete methods or equipment. Their approach is, "Well, here's how you did it last time—now how is the best and fastest way to do it today or next year?"

This means new equipment will be employed in all possible cases in the old plants that made ordnance material during the war. Of course, no orders have been placed, but should the international situation boil over, the machine tool industry will know precisely what kind of equipment will be required in each of the plants that the ordnance engineers have surveyed.

In Philadelphia, despite a large increase in the volume of inquiries since the election, there has been no change in orders, which continue in pre-election low volume. Present inquiries are thought to be largely for budget purposes and proposed for early 1949 purchase.

Dealers are rather pessimistic, with volume low and sales outlook indefinite. No large buying programs are on the horizon at present, nor have there been concrete developments in the Westinghouse Kansas City jet engine plant. Approval for expenditures has not been released, but inquiries have been placed on competitive lines of tools. Apart from this program there are probably few tool-buying industries in this area where the current order backlogs are large enough to justify important purchases of new production equipment.

Standard tool deliveries are very good, a matter of 2 to 3 weeks. A producer of lathes raised prices 10 pct last week, reflecting an upward adjustment to meet the level of price advances taken by other builders. Trade sources do not, however, anticipate further machine tool price increases in the near future.

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11 years ago Crucible Steel Company's Chicago warehouse started something when they installed their first MARVEL Saws to give fast service on "cut to size" orders. Today, 9 Crucible Steel Company warehouses are equipped with MARVEL Saws. Each warehouse can deliver accurately cut-off lengths or slices from even the largest bars and billets on short notice; or literally thousands of identical pieces cut-off automatically from single or nested bars at terrific speed.

The above picture of the new cutting-off department in Chicago shows two No. 18 MARVEL Giant Hydraulic Saws (capacity 18" x 18") and two No. 9A MARVEL Automatic Production Saws (capacity 10" x 10").

ARMSTRONG-BLUM MFG. CO.
"The Hack Saw People"
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ONE 18" X 22" MACHINE
THREE 10" X 10" MACHINES
ONE BAND SAW
WITH THIS EQUIPMENT WE CAN CUT YOUR ORDER THE SAME DAY RECEIVED.

MARVEL *Metal Cutting* **SAWS**
Better Machines-Better Blades

NONFERROUS METALS

. . . News and Market Activities

Scrap Men and Producers Play Hop, Skip and Jump with Prices

New York

• • • **Following the** adoption of the 2¢ zinc increase by all producers last week, upward revisions of alloy brass mill products have been announced by the American Brass Co. and Bridgeport Brass Co. These increases were accompanied by increases of ½¢ to ⅞¢ per lb in brass mill scrap buying prices for some alloy grades. Although other mills had not taken similar action early this week, present indications are that it will be universal by the end of the week.

Secondary aluminum ingot producers raised prices by ½¢ to 1¢ per lb last week, reflecting further increases in the price of scrap. Some grades of remelted ingots are quoted now at more than 30¢ per lb. Foundries are overanxious to buy even at these prices and in view of the shortage of scrap are building up the price of the metal. Current prices reflect increases in scrap and ingots made week after week ever since the end of the summer.

The shortage of ingots has grown so severe that some factors in the trade are canvassing the possibility of having an admittedly high cost virgin ingot producer taken over by some group who would operate it temporarily to produce and sell high priced primary ingots to foundries. The thought is that the pinch for scrap is so strong that present demand might well force scrap and secondary ingot prices even higher. Adequate alumina for the operation of a presently inactive reduction plant could be made available readily by primary producers. It is conceivable that if power could be bought even as high as 9¢ per lb of ingot, there might be a significant saving in the price of ingots to foundries. Primary producers consider a power cost of 3¢ per lb of aluminum the maximum that would permit sale at present pig and ingot prices.

A step in this direction has already been taken by the Aluminum Research Institute when it made an informal bid for the operation of the government's Massena, N. Y. reduction plant for this purpose. The plant was recently bought by the Aluminum Co. of America at a price of $5 million. The two remaining reduction plants which could be used for such a purpose include the ones at Burlington, N. J. and River Bank, Calif. These plants have only high priced power available to them.

Prices of brass and zinc scrap grades also increased again last week by an average of ½¢ per lb.

Metal Shortages Continue So Severe Buyers Are Unable To Keep Up Operations

° ° °

Important shortages continue in copper, lead and zinc with buyers unable to obtain enough metal to carry on operations. Premium prices for foreign and secondary metals are continuing, and are being paid by consumers in view of the shortages. Producers of zinc say that requirements of die casters are down by 10 pct to 15 pct. But this is only a temporary condition and they are expected to be back in the market soon for usual requirements. The recent increase in zinc has caused no apparent easing off of demand.

The strike at the Kennecott Copper Co. operations in Utah is continuing and is creating an unfortunate situation for consumers. In view of the continuation of the strike and the prevalence of the heavy demand on the scrap market by all factors, most observers see the probability of a price increase in the immediate future. There are no important tonnages available to meet the active demand. All factors in the market except one are pricing copper on the basis of price prevailing on the date of shipment. This action is necessary to protect producers against loss.

The meetings of the Dept. of Commerce Office of International Trade with metals producers in Washington last week resulted in no conclusive developments or action to be taken to limit current exports of bonded metal. Such action would be impossible without jeopardizing the tonnages of imports of ores and concentrates into this country. However, industry members report that there were reductions in fourth quarter export quotas of domestic zinc and some lead products.

Nonferrous Metals Prices

	Nov. 17	Nov. 18	Nov. 19	Nov. 20	Nov. 22	Nov. 23
Copper, electro, Conn.	23.50	23.50	23.50	23.50	23.50	23.50
Copper, Lake, Conn.	23.625	23.625	23.625	23.625	23.625	23.625
Tin, Straits, New York	$1.03	$1.03	$1.03	$1.03	$1.03	$1.03
Zinc, East St. Louis	17.50	17.50	17.50	17.50	17.50	17.50
Lead, St. Louis	21.30	21.30	21.30	21.30	21.30	21.30

Says ECA Helps Business When Used as Intended

Buffalo

• • • **The Economic** Co-operation Administration "can help us do business if we use it the way it is intended we use it," American businessmen eyeing foreign markets were told at the second Materials Handling Conference sponsored by the Westinghouse Electric Corp.

D. E. Akins, manager of the apparatus division of the Westinghouse Electric International Co., said:

"It is sometimes mistakenly believed that ECA is a purchasing and financing agency, which is far from the truth..

UNIVERSITY OF MICHIGAN LIBRARIES

Primary Metals

(Cents per lb, unless otherwise noted)

Aluminum, 99+%, 10,000 lb, freight allowed	17.00
Aluminum pig	16.00
Antimony, American, Laredo, Tex.	38.50
Beryllium copper, 3.75-4.25% Be dollars per lb contained Be	$24.50
Beryllium aluminum 5% Be, dollars per lb contained Be	$52.00
Cadmium, del'd	$2.00
Cobalt, 97-99% (per lb)	$1.65 to $1.72
Copper electro, Conn. Valley	23.50
Copper, lake, Conn. Valley	23.625
Gold, U. S. Treas., dollars per oz.	$35.00
Indium, 99.8%, dollars per troy oz.	$2.25
Iridium, dollars per troy oz.	$110 to $115
Lead, St. Louis	21.30
Lead, New York	21.50
Magnesium, 99.8+%, f.o.b. Freeport, Tex.	20.50
Magnesium, sticks, carlots	34.50
Mercury, dollars per 76-lb flask, f.o.b. New York	$78 to $80
Nickel, electro, f.o.b. New York	42.90
Palladium, dollars per troy oz.	$24.00
Platinum, dollars per troy oz.	$93 to $96
Silver, New York, cents per oz.	73.75
Tin, Grade A, New York	$1.03
Zinc, East St. Louis	17.50
Zinc, New York	18.15
Zirconium copper, 10-12 pct Zr, per lb contained Zr	$12.00

Remelted Metals

Brass Ingot

(Published prices, cents per lb delivered, carloads)

85-5-5-5 ingot		
No. 115	21.50*	22.00
No. 120	21.00*	21.50
No. 123	20.50*	21.00
80-10-10 ingot		
No. 305		27.25
No. 315		24.25
88-10-2 ingot		
No. 210		33.00
No. 215		31.00
No. 245	25.75*	25.75
Yellow ingot		
No. 405	17.50*	17.50
Manganese bronze		
No. 421		23.00

* F.o.b. Philadelphia.

Aluminum Ingot

(Cents per lb, lots of 30,000 lb)

95-5 aluminum-silicon alloys	
0.30 copper, max.	31.25–31.75
0.60 copper, max.	30.75–31.25
Piston alloys (No. 122 type)	26.50–27.00
No. 12 alum. (No. 2 grade)	26.25–26.75
108 alloy	26.50–27.00
195 alloy	27.00–27.25
13 alloy	31.00–31.50
AXS-679	27.25–27.75

Steel deoxidizing aluminum, notch-bar granulated or shot

Grade 1—95 pct-95½ pct	28.75–29.50
Grade 2—92 pct-95 pct	27.75–28.50
Grade 3—90 pct-92 pct	26.75–27.50
Grade 4—85 pct-90 pct	26.25–26.75

Electroplating Supplies

Anodes

(Cents per lb, freight allowed, in 500 lb lots)

Copper	
Cast, oval, 15 in. or longer	40⅛
Electrodeposited	34⅝
Rolled, oval, straight, delivered	37.34
Ball anodes	38⅜
Brass, 80-20	
Cast, oval, 15 in. or longer	35⅞
Zinc, oval, 99.99	
Ball anodes	
Nickel 99 pct plus	
Cast	59.00
Rolled, depolarized	$2.10
Cadmium	
Silver 999 fine, rolled, 100 oz. lots, per troy oz, f.o.b. Bridgeport, Conn.	81

Chemicals

(Cents per lb, f.o.b. shipping point)

Copper cyanide, 100 lb drum	46.00
Copper sulfate, 99.5 crystals, bbls.	9.10
Nickel salts, single or double, 100 lb bags, frt. allowed	18.50
Nickel chloride, 300 lb bbl.	24.50
Silver cyanide, 100 oz. lots, per oz.	61
Sodium cyanide, 96 pct domestic 100 lb drums	16.00
Zinc sulfate, crystals, 22.5 pct, bags	
Zinc sulfate, 25 pct, granules, bbls. frt. allowed	

Mill Products

Aluminum

(Base prices, cents per pound, base 30,000 lb, f.o.b. shipping point, freight allowed)

Flat Sheet: 0.188 in., 2S, 3S, 26.9¢; 4S, 61S-O, 28.8¢; 52S, 30.9¢; 24S-O, 24S-OAL, 29.8¢; 75S-O, 75S-OAL, 36.3¢; 0.081 in., 2S, 3S, 27.9¢; 4S, 61S-O, 30.2¢; 52S, 32.3¢; 24S-O, 24S-OAL, 30.9¢; 75S-O, 75S-OAL, 38¢; 0.032 in., 2S, 3S, 29.5¢; 4S, 61S-O, 33.5¢; 52S, 36.2¢; 24S-O, 24S-OAL, 37.9¢; 75S-O, 75S-OAL, 47.6¢.

Plate: ¼ in. and heavier: 2S, 3S, F, 23.8¢; 4S-F, 26¢; 52S-F, 27.1¢; 61S-O, 26.6¢; 24S-F, 24S-FAL, 27.1¢; 75S-F, 75S-FAL, 33.9¢.

Extruded Solid Shapes: Shape factors 1 to 4; 35.1¢ to 66¢; 11 to 13, 36.1¢ to 78¢; 23 to 25, 38.2¢ to $1.07; 35 to 37, 45.7¢ to $1.65; 47 to 49, 67.5¢ to $2.41.

Rod, Rolled: 1.064 to 4.5 in., 2S-F, 3S-F, 34¢ to 30.5¢; Cold-finished, 0.375 to 3.5 in., 2S, 3S, 36.5¢ to 32¢.

Screw Machine Stock: Drawn, ⅛ to 11/32 in., 11S-T3, R317-T4, 49¢ to 38¢; cold-finished, ⅜ to 1½ in., 11S-T3, 37.5¢ to 35.5¢; ⅜ to 2 in., R317-T4, 36.5¢ to 33.5¢; rolled, 1 9/16 to 3 in., 11S-T3, 35.5¢ to 32.5¢; 2⅛ to 3⅜ in., R317-T4, 32.5¢ to 31.5¢. Base 5000 lb.

Drawn Wire: Coiled, 0.051 to 0.374 in.: 2S, 36¢ to 26.5¢; 52S, 44¢ to 32¢; 56S, 47¢ to 38.5¢; 17S-T4, 50¢ to 34.5¢; 61S-T4, 44.5¢ to 34¢; 75S-T6, 76¢ to 55¢.

Magnesium

(Cents per lb, f.o.b. mill, freight allowed Base quantity 30,000 lb)

Sheet and Plate: Ma, FSa, ¼ in., 54¢-56¢; 0.188 in., 56¢-58¢; B & S gage 8, 58¢-60¢; 10, 59¢-61¢; 12, 63¢-65¢; 14, 69¢-74¢; 16, 76¢-81¢; 18, 84¢-89¢; 20, 96¢-$1.01; 22, $1.22-$1.31; 24, $1.62-$1.75. Specification grade higher.

Extruded Round Rod: M, diam. in., ¼ to 0.311, 58¢; ½ to ¾, 46¢; 1¼ to 1.749, 43¢; 2½ to 5, 41¢. Other alloys higher.

Extruded Square, Hex. Bar: M, size across flats, in., ¼ to 0.311, 61¢; ½ to 0.749, 48¢; 1¼ to 1.749, 44¢; 2½ to 4, 42¢. Other alloys higher.

Extruded Solid Shapes, Rectangles: M, in weight per ft, for perimeters of less than size indicated, 0.10 to 0.11 lb. per ft. per. up to 3.5 in., 55¢; 0.22 to 0.25 lb per ft, per. up to 5.9 in., 51¢; 0.50 to 0.59 lb per ft, per. up to 8.6 in., 47¢; 1.8 to 2.59 lb per ft, per. up to 19.5 in., 44¢; 4 to 6 lb per ft, per. up to 28 in., 43¢. Other alloys higher.

Extruded Round Tubing: M, wall thickness, outside diam, in., 0.049 to 0.057, ¼ to 5/16, $1.14; 5/16 to ⅜, $1.02; ½ to ⅝, 76¢; 1 to 2 in., 65¢. 0.065 to 0.082, ⅜ to 7/16, 85¢; ⅝ to ¾, 62¢; 1 to 2 in., 57¢. 0.165 to 0.219, ⅞ to ¾, 54.5¢; 1 to 2 in., 53¢; 3 to 4 in., 49¢. Other alloys higher.

Nickel and Monel

(Cents per lb, f.o.b. mill)

	Nickel	Monel
Sheets, cold-rolled	60	47
Strip, cold-rolled	66	50
Rods and shapes		
Hot-rolled	56	45
Cold-drawn	56	45
Angles, hot-rolled	56	45
Plates	58	46
Seamless tubes	89	80
Shot and blocks	..	40

Copper, Brass, Bronze

(Cents per pound, freight prepaid on 200 lb)

	Extruded Shapes	Rods	Sheets
Copper	36.78	..	37.18
Copper, hot-rolled	..	33.28	..
Copper, drawn	..	34.28	..
Low brass	38.57*	35.35	35.66
Yellow brass	37.60*	34.28	34.59
Red brass	38.92*	35.70	36.01
Naval brass	33.92	32.67	38.61
Leaded brass	..	28.30	..
Commercial bronze	39.54*	36.57	36.88
Manganese bronze	37.51	36.01	42.11
Phosphor bronze, 5 pct	57.80*	56.30	56.05
Muntz metal	33.47	32.22	36.66
Everdur, Herculoy, Olympic, etc.	40.43	40.67	41.73
Nickel silver, 10 pct	..	46.42	44.20
Architectural bronze	..	..	32.33

* Seamless tubing.

Scrap Metals

Brass Mill Scrap

(Cents per pound; add 1¢ per lb for shipments of 15,000 or more)

	Heavy	Turnings
Copper	21⅛	20⅝
Yellow brass	18⅞	18⅛
Red brass	20	19
Commercial bronze	20⅛	19
Manganese bronze	17¾	16⅞
Leaded brass rod ends	17¾	

Custom Smelters' Scrap

(Cents per pound, carload lots, delivered to refinery.)

No. 1 copper wire	20.50–21.00
No. 2 copper wire	19.50–20.00
Light copper	18.50–19.00
Refinery brass	18.50*–18.75*

* Dry copper content.

Ingot Makers' Scrap

(Cents per pound, carload lots, delivered to producer.)

No. 1 copper, wire	19.75
No. 2 copper, wire	18.75
Light copper	17.75
No. 1 composition	16.75–17.00
No. 1 comp. turnings	16.50–16.75
Rolled brass	13.00–13.50
Brass pipe	13.25–13.75
Radiators	14.00
Heavy yellow brass	12.50–12.75
Aluminum	
Mixed old cast	16.50
Mixed old clips	16.75
Mixed turnings, dry	14.50
Pots and pans	16.75
Low copper	19.00

Dealers' Scrap

(Dealer's buying prices, f.o.b. New York in cents per pound)

Copper and Brass	
No. 1 heavy copper and wire	18½—19
No. 2 heavy copper and wire	17½—18
Light copper	16½—17
Auto radiators (unsweated)	12¾—13
No. 1 composition	15 —15½
No. 1 composition turnings	14½—15
Clean red car boxes	12½—13
Cocks and faucets	12½—13
Mixed heavy yellow brass	9½—10
Old rolled brass	12 —12½
Brass pipe	13 —13½
New soft brass clippings	15 —15½
Brass rod ends	13 —13½
No. 1 brass rod turnings	12½—13
Aluminum	
Alum. pistons and struts	8½— 9
Aluminum crankcases	12½—13
2S aluminum clippings	16½—17
Old sheet & utensils	12½—13
Borings and turnings	6 — 6½
Misc. cast aluminum	12½—13
Rural clips (24S)	12½—13
Zinc	
New zinc clippings	11½—12
Old zinc	10 —10½
Zinc routings	5¾— 6¼
Old die cast scrap	6¾— 7¼
Nickel and Monel	
Pure nickel clippings	22 —23
Clean nickel turnings	17 —18
Nickel anodes	22 —23
Nickel rod ends	21 —22
New Monel clippings	15½—16½
Clean Monel turnings	11 —12
Old sheet Monel	13 —14
Old Monel castings	10 —11
Inconel clippings	12 —13
Nickel silver clippings, mixed	8 — 8½
Nickel silver turnings, mixed	7 — 7½
Lead	
Soft scrap lead	20 —20½
Battery plates (dry)	13 —13½
Magnesium Alloys	
Segregated solids	8 — 9
Castings	4½— 5½
Miscellaneous	
Block tin	82 —84
No. 1 pewter	65 —67
No. 1 auto babbitt	51 —53
Mixed common babbitt	20 —20½
Solder joints	22½—23½
Siphon tops	50 —52
Small foundry type	21½—22
Monotype	20½—21
Lino. and stereotype	20 —20½
Electrotype	18½—19
New type shell cuttings	16½—17
Hand picked type shells	7½— 8
Lino. and stereo dross	11½—12
Electro dross	8 —8½

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UNITED STATES STEEL

UNIVERSITY OF MICHIGAN LIBRARIES

SCRAP

Prices Firm; Movement of Shipments Good

New York

• • • **The market generally** looks better than it has for quite some time. Shipments are moving in good volume and mills are buying all the scrap they can get at current price levels which are firm.

The lid has blown off railroad specialties in Chicago as they hit an all-time high. Rerolling rails went at $70 to $73 and standard steel car axles at $83 to $85. In Pittsburgh, however, some railroad specialties went up $1 while others dropped 50¢.

Following the action taken by New York Central recently, 3 railroads in the Chicago area followed suit and stopped selling heavy melting on an earmarked basis. Some others are expected to follow suit. Some quarters, however, are of the opinion that these companies might go back to the procedure of selling most of this material on an earmarked basis in the near future as they have for many years in the past.

In Boston the market was generally dull except for No. 1 heavy melting which moved up $1 and brought a top of $38.50. In the meantime dealers in the Buffalo area are reported shipping as rapidly as possible to get their yards clear before winter. One dealer expects to have his yard inventory down to 200 tons by New Year's Day.

Cast grades in most areas are spotty and weak. The exception is the Birmingham district where No. 1 cupola cast went up a solid dollar to go at $71 to $73 while mixed yard cast brought as much as $70 a ton.

In New York the clean cast chemical boring market passed out of the picture. Shipments have been shut off until after the first of the year and any price quoted would be nominal.

•

PITTSBURGH—Shipments into the district were moving well during the past week, with a little slowdown to be chalked up to the Thanksgiving Holiday. The dock strike delayed movement of about 25,000 tons of German scrap into Pittsburgh mills of Carnegie-Illinois, which is still receiving local scrap but has been diverting large tonnages to Chicago to permit unloading the German material. Reports of minor incidents involving this scrap have been exaggerated in some quarters. Two or three fuses or detonators are believed to have been touched off during the melting of some of the first material to arrive at Homestead Works. No one was hurt. No furnaces were damaged. To prevent a repetition, the European inspection will be supplemented by another in this country. Particular check will be made of parts that might contain small explosive charges. Railroad specialties were somewhat weaker in couplers and wheels, stronger in springs.

•

CHICAGO—Some railroad specialties hit an all-time high last week. Rerollers and car axles are now worth their weight in gold. A significant development last week was the decision of some of the major railroads to advertise and sell their railroad heavy melting to the highest bidder. For the past year much of this tonnage was earmarked to the mills at a formula price. In certain cases the roads sold all tonnages at this price, while in other cases the roads split their tonnage. The new setup apparently means that for the time being these railroads will not earmark their scrap but will sell all their heavy melting on a free market price. Some observers here claim that if all scrap was dumped on the open market and made available to anybody at any price, that this action would crack the high price experienced in the past year. The mills are still bragging about their inventory and there has been no significant price changes on steel mill items.

•

PHILADELPHIA—The heavy melting market is steady in this district. Mills that have been banking on foreign scrap shipments have been disappointed by the longshoremen's strike, but belief is general that this situation will be cleared up reasonably soon. One mill is out of the market again. The No. 1 market is unchanged at previous prices, although it is apparent that some brokers are paring the profit to 50¢. Prime grades of No. 1 are going into low phos grading and the one consumer in this district at the present time is growing more critical of the quality. Cast grades are firm but pipe foundries are getting fussy about taking steel out of cast grades. Chemical borings are weaker because of the absence of all factors from the market. The major buyer has held up shipments until after the first of the year. Shovelings are quoted 50¢ higher with the re-entry of a buyer into the market.

•

CLEVELAND—Anybody will take just about anything at the formula, which is another way of saying that no radical change in the scrap market here or in the Valley within the next week or so is anticipated by the trade. Neither steel nor gray iron foundries are too eager to buy, which is normal for this time of year. Steel foundries are comfortable, and the gray iron market is quiet, although a sudden demand for a big tonnage could readily upset the applecart. Mills are averaging about 6 weeks on the ground, and shipments, while hampered by the freight car shortage, have been fairly good. The expansion of the conversion business has required enough scrap to keep things boiling for the mills.

•

DETROIT—The Detroit scrap market is static again this week as large mills continue to buy at going prices. Reports of over-the-market sales are still being heard and some sources insist that the volume of such sales is considerable. Cast iron grades continue spotty and with many jobbing foundries out of the market there are definite indications of weakness according to scrap sources here. Prices are unchanged again this week.

•

CINCINNATI—On the basis of sentiment, the market here is not so hot. Prices are holding on both openhearth and foundry grades, and shipments have been holding up fairly well, but there is the growing suspicion, founded or unfounded, that the peak has been reached, and the boys are beginning to worry about having orders ahead. The shortage of cars has apparently bypassed the local Cincinnati area and when material is ready to move, there is transportation. Demand for foundry grades is showing a seasonal decline, but major consumers of openhearth grades are in the market continuously.

•

NEW YORK—The market continues to look good this week. Shipments are moving in good volume and prices remain firm at current levels. The mills are still taking all the good scrap they can get to build up and maintain their winter stockpiles. In the chemical borings market, however, shipments have been held up completely. There just isn't any market now, there won't be until after the end of the year—and any price quoted is nominal.

•

BIRMINGHAM—For the third time in a month, prices for cast iron have advanced in this market. No. 1 cupola cast is up $1 to $73. Mixed cast is bringing as much as $70. Prices for steel grades are unchanged but the undertone is strong on some specialties. Mills continue to obtain consumption of openhearth material.

•

BOSTON—Except for No. 1 heavy melting steel which is selling for between $34.40 to $38.50, a slight improvement over previous quotations, the market here has turned dull and weak. Buyers say there just is no buying. However, with this weakening in activity, there is no drop in price. Some brokers don't want to quote prices because of the sudden inactivity.

•

BUFFALO—Buying for conversion purposes at premiums of 50¢ to $1.75 a ton continued to bar large scale orders in the local market. Some dealers said this type of demand was less aggressive but still adequate to absorb limited supplies. A brisk business was reported in blast furnace scrap at regular prices as three of the leading consumers entered the market at the same time and bought an estimated several thousand tons.

Going prices as obtained in the trade by THE IRON AGE, based on representative tonnages.

PITTSBURGH

Per gross ton delivered to consumer:

No. 1 hvy. melting	$42.50 to $43.00
RR. hvy. melting	43.50 to 44.00
No. 2 hvy. melting	42.50 to 43.00
RR. scrap rails	58.00 to 59.00
Rails 2 ft and under	62.00 to 62.50
No. 1 comp'd bundles	42.50 to 43.00
Hand bdld. new shts.	42.50 to 43.00
Hvy. axle turn.	45.50 to 46.50
Hvy. steel forge turn.	45.50 to 46.50
Mach. shop turn.	37.50 to 38.00
Shoveling turn.	39.00 to 40.00
Mixed bor. and turn.	37.50 to 38.00
Cast iron borings	39.50 to 40.00
No. 1 mach. cast	69.50 to 70.50
Mixed yard cast	64.00 to 65.00
Hvy. breakable cast.	61.00 to 62.00
Malleable	76.00 to 77.00
RR. knuck. and cup.	57.00 to 58.00
RR. coil springs	58.50 to 59.50
RR. leaf springs	58.50 to 59.50
Rolled steel wheels	57.00 to 58.00
Low phos.	49.00 to 50.00

CHICAGO

Per gross ton delivered to consumer:

No. 1 hvy. melting	$41.50 to $42.00
No. 2 hvy. melting	41.50 to 42.00
No. 1 bundles	41.50 to 42.00
No. 2 dealers' bundles	41.50 to 42.00
Bundled mach. shop turn.	41.50 to 42.00
Galv. bundles	39.50 to 40.00
Mach. shop turn.	36.50 to 37.00
Short shov. turn.	38.50 to 39.00
Cast iron borings	37.50 to 38.00
Mix. borings and turn.	36.50 to 37.00
Low phos. hvy. forge	51.00 to 52.00
Low phos. plates	49.00 to 50.00
No. 1 RR. hvy. melt.	44.25 to 50.00
Rerolling rails	71.00 to 73.00
Miscellaneous rails	65.00 to 66.00
Angles & splice bars	58.00 to 59.00
Locomotive tires, cut	59.00 to 60.00
Cut bolster & side frames	52.00 to 55.00
Standard stl. car axles	83.00 to 85.00
No. 3 steel wheels	53.00 to 54.00
Couplers and knuckles	54.00 to 55.00
Rails, 2 ft and under	62.50 to 65.00
Malleable	83.00 to 84.00
No. 1 mach. cast	72.00 to 73.00
No. 1 agricul. cast	63.00 to 64.00
Heavy breakable cast.	62.00 to 64.00
RR. grate bars	60.00 to 64.00
Cast iron brake shoes	60.00 to 61.00
Cast iron car wheels	65.00 to 66.00

CINCINNATI

Per gross ton, f.o.b. cars:

No. 1 hvy. melting	$40.00 to $41.00
No. 2 hvy. melting	40.00 to 41.00
No. 1 bundles	40.00 to 41.00
No. 2 bundles	40.00 to 41.00
Mach. shop turn.	35.00 to 36.00
Shoveling turn.	37.00 to 38.00
Cast iron borings	36.00 to 37.00
Mixed bor. & turn.	35.00 to 36.00
Low phos., 18 in. under	48.00 to 49.00
No. 1 cupola cast.	65.00 to 66.00
Hvy breakable cast	59.00 to 60.00
Rails 18 in. and under	61.00 to 63.00
Rails random length	56.00 to 57.00
Drop broken	69.00 to 70.00

BOSTON

Brokers' buying prices per gross ton, on cars:

No. 1 hvy. melting	$34.40 to $38.50
No. 2 hvy. melting	34.40
Nos. 1 and 2 bundles	34.40
Bushelings	34.40
Shoveling turn.	31.40
Machine shop turn.	29.40
Mixed bor. and turn.	29.40
Cl'n cast chem. bor.	37.50 to 38.50
No. 1 machinery cast.	64.00 to 65.00
No. 2 machinery cast.	59.00 to 60.00
Heavy breakable cast.	53.50 to 54.50
Stove plate	56.00 to 57.00

DETROIT

Per gross ton, brokers' buying prices f.o.b. cars:

No. 1 hvy. melting	$38.00
No. 2 hvy. melting	38.00
No. 1 bundles	38.00
New busheling	38.00
Flashings	38.00
Mach. shop turn.	$32.50 to 33.00
Machinery cast	63.00 to 65.00
Mixed yard cast	57.00 to 58.00
Shoveling turn.	34.50 to 35.00
Cast iron borings	33.50 to 34.00
Mixed bor. & turn.	34.50 to 35.00
Low phos. plate	42.50 to 43.00
Heavy breakable cast.	53.00 to 57.00
Stove plate	57.00 to 58.00
Automotive cast.	64.00 to 66.00

PHILADELPHIA

Per gross ton delivered to consumer:

No. 1 hvy. melting	$44.00 to $45.00
No. 2 hvy. melting	41.00 to 41.50
No. 1 bundles	44.00 to 45.00
No. 2 bundles	41.00 to 41.50
Mach. shop turn.	37.00 to 38.00
Shoveling turn.	39.00 to 39.50
Mixed bor. and turn.	36.75 to 37.25
Clean cast chemical bor.	42.00 to 43.00
No. 1 machinery cast.	66.00 to 67.00
No. 1 mixed yard cast.	61.00 to 62.00
Hvy. breakable cast.	62.00 to 63.00
Clean auto cast.	65.00 to 66.00
Hvy. axle forge turn.	46.00 to 47.00
Low phos. plate, openhearth	49.00 to 50.00
Low phos., electric furnace	51.00 to 52.00
Low phos. bundles	48.00 to 49.00
RR. steel wheels	54.00 to 55.00
RR. coil springs	54.00 to 55.00
RR. malleable	80.00 to 82.00
Cast iron carwheels	68.00 to 70.00

ST. LOUIS

Per gross ton delivered to consumer:

No. 1 hvy. melting	$43.00 to $44.00
No. 2 hvy. melting	40.00 to 41.00
Bundled sheets	40.00 to 41.00
Mach. shop turn.	35.00 to 36.00
Shoveling turnings	37.00 to 38.00
Locomotive tires; uncut	47.00 to 48.00
Mis. std. sec. rails	57.00 to 58.00
Steel angle bars	54.00 to 55.00
Rails 3 ft and under	60.00 to 62.00
RR. steel springs	49.00 to 50.00
Steel car axles	72.00 to 73.00
Brake shoes	59.00 to 60.00
Malleable	75.00 to 77.00
Cast iron car wheels	63.00 to 64.00
No. 1 machinery cast.	66.00 to 67.00
Hvy. breakable cast.	60.00 to 61.00

BIRMINGHAM

Per gross ton delivered to consumer:

No. 1 hvy. melting	$40.00
No. 2 hvy. melting	40.00
No. 2 bundles	40.00
No. 1 bunsheling	40.00
Long turnings	$32.00 to 33.00
Shoveling turnings	35.00 to 36.00
Cast iron borings	29.50
Bar crops and plate	44.00 to 45.00
Structural and plate	44.00 to 45.00
No. 1 cupola cast.	71.00 to 73.00
Stove plate	65.00 to 67.00
No. 1 RR. hvy. melt.	41.00
Steel axles	51.00 to 52.00
Scrap rails	44.00 to 45.00
Rerolling rails	65.00 to 67.00
Angles & splice bars	53.00 to 54.00
Rails 3 ft & under	53.00 to 54.00
Cast iron carwheels	63.00 to 64.00

YOUNGSTOWN

Per gross ton delivered to consumer:

No. 1 hvy. melting	$42.50 to $43.00
No. 2 hvy. melting	42.50 to 43.00
Mach. shop turn.	37.50 to 38.00
Short shov. turn.	39.00 to 40.00
Cast iron borings	38.00 to 39.00
Low phos.	47.50 to 48.00

NEW YORK

Brokers' buying prices per gross ton, on cars:

No. 1 hvy. melting	$38.50 to $39.00
No. 2 hvy. melting	37.00
No. 2 bundles	37.00
Mach. shop turn.	31.50 to 32.00
Mixed bor. & turn.	31.50 to 32.00
Shoveling turnings	33.50 to 34.00
Machinery cast.	59.00 to 60.00
Mixed yard cast	57.00 to 58.00
Heavy breakable cast.	56.00 to 57.00
Charging box cast.	56.00 to 57.00
Unstrp. motor blks.	53.50 to 54.50
Cl'n cast chem. bor.	38.00 to 39.00

BUFFALO

Per gross ton delivered to consumer:

No. 1 hvy. melting	$47.00 to $49.00
No. 2 hvy. melting	41.75 to 42.25
No. 1 bundles	41.75 to 42.25
No. 2 bundles	41.75 to 42.25
No. 1 busheling	41.75 to 42.25
Mach. shop turn.	36.75 to 37.25
Shoveling turn.	38.75 to 39.25
Cast iron borings	37.75 to 38.25
Mixed bor. and turn.	36.75 to 37.25
Clean auto. cast.	69.00 to 70.00
Mixed cupola cast.	66.00 to 68.00
Stove plate	66.00 to 68.00
RR. malleable	70.00 to 75.00
Small indus. malleable	47.00 to 49.00
Low phos. plate	48.00 to 50.00
Scrap rails	58.00
Rails 3 ft & under	63.00 to 64.00
RR. steel wheels	56.00 to 58.00
RR. coil & leaf spgs.	56.00 to 58.00
RR. knuckles & coup.	56.00 to 58.00

CLEVELAND

Per gross ton delivered to consumer:

No. 1 hvy. melting	$42.00 to $42.50
No. 2 hvy. melting	42.00 to 42.50
No. 1 bundles	42.00 to 42.50
No. 1 busheling	42.00 to 42.50
Drop forge flashings	42.00 to 42.50
Mach. shop turn.	37.00 to 37.50
Shoveling turn.	38.50 to 39.50
Steel axle turn.	42.00 to 42.50
Cast iron borings	37.50 to 38.50
Mixed bor. & turn.	36.50 to 37.50
Low phos. 2 ft and under	47.00 to 47.50
No. 1 machinery cast.	73.00 to 75.00
Malleable	79.00 to 81.00
RR. cast.	76.00 to 78.00
Railroad grate bars	60.00 to 62.00
Stove plate	61.00 to 63.00
RR. hvy. melting	43.00 to 43.50
Rails 3 ft and under	63.50 to 64.50
Rails 18 in. and under	65.00 to 66.00

SAN FRANCISCO

Per gross ton, f.o.b. shipping point:

No. 1 hvy. melting	$27.50
No. 2 hvy. melting	27.50
No. 2 bales	27.50
No. 3 bales	24.50
Mach. shop turn.	18.00
Elec. fur. 1 ft under	$40.00 to 42.00
No. 1 cupola cast.	58.00 to 60.00
RR. hvy. melting	28.50
Rails	29.00

LOS ANGELES

Per gross ton, f.o.b. shipping point:

No. 1 hvy. melting	$27.50
No. 2 hvy. melting	27.50
No. 1 bales	27.50
No. 2 bales	27.50
No. 3 bales	24.50
Mach. shop turn.	20.00
Elec. fur. 1 ft under	$40.00 to 42.00
No. 1 cupola cast.	58.00 to 68.00
RR. hvy. melting	28.50

SEATTLE

Per gross ton delivered to consumer:

No. 1 & No. 2 hvy. melt.	$27.50 to $30.00
Elec. fur. 1 ft and under	40.00 to 42.00
No. 1 cupola cast.	50.00 to 54.00
RR. hvy. melting	30.00 to 33.00

HAMILTON, ONT.

Per gross ton delivered to consumer: Cast grades f.o.b. shipping point:

Heavy melting	$23.00*
No. 1 bundles	23.00*
No. 2 bundles	22.50*
Mechanical bundles	21.00*
Mixed steel scrap	19.00*
Mixed borings and turnings	17.00*
Rails, remelting	23.00*
Rails, rerolling	26.00*
Bushelings	17.50*
Bushelings, new fact, prop'd	21.00*
Bushelings, new fact, unprop'd	16.00*
Short steel turnings	17.00*
No. 1 cast	$48.00 to 50.00*
No. 2 cast	44.00 to 45.00*

*Ceiling Price

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LEADERS IN IRON AND STEEL SCRAP SINCE 1889

Comparison of Prices . .

Price advances over previous week are printed in **Heavy Type**; declines appear in *Italics*.

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Flat-Rolled Steel: (cents per pound)	Nov. 23, 1948	Nov. 16, 1948	Oct. 26, 1948	Nov. 25, 1947
Hot-rolled sheets	3.26	3.26	3.26	2.80
Cold-rolled sheets	4.00	4.00	4.00	3.55
Galvanized sheets (10 ga)	4.40	4.40	4.40	3.95
Hot-rolled strip	3.265	3.265	3.265	2.80
Cold-rolled strip	4.063	4.063	4.063	3.55
Plates	3.42	3.42	3.42	2.95
Plates wrought iron	7.85	7.85	7.85	6.85
Stains C-R strip (No. 302)	33.25	33.25	33.25	30.50
Tin and Terneplate: (dollars per base box)				
Tinplate (1.50 lb) cokes	$6.80	$6.80	$6.80	$5.75
Tinplate, electro (0.50 lb)	6.00	6.00	6.00	5.05
Special coated mfg. ternes	5.90	5.90	5.90	4.90
Bars and Shapes: (cents per pound)				
Merchant bars	3.37	3.37	3.37	2.90
Cold-finished bars	3.995	3.995	3.995	3.55
Alloy bars	3.75	3.75	3.75	3.30
Structural shapes	3.25	3.25	3.25	2.80
Stainless bars (No. 302)	28.50	28.50	28.50	26.00
Wrought iron bars	9.50	9.50	9.50	7.15
Wire: (cents per pound)				
Bright wire	4.256	4.256	4.256	3.55
Rails: (dollars per 100 lb)				
Heavy rails	$3.20	$3.20	$3.20	$2.75
Light rails	3.55	3.55	3.55	3.10
Semifinished Steel: (dollars per net ton)				
Rerolling billets	$52.00	$52.00	$52.00	$45.00†
Slabs, rerolling	52.00	52.00	52.00	45.00†
Forging billets	61.00	61.00	61.00	55.00†
Alloy blooms, billets, slabs	63.00	63.00	63.00	66.00†
Wire rod and Skelp: (cents per pound)				
Wire rods	3.619	3.619	3.619	2.80
Skelp	3.25	3.25	3.25	2.60

† Gross ton

Pig Iron: (per gross ton)	Nov. 23, 1948	Nov. 16, 1948	Oct. 26, 1948	Nov. 25, 1947
No. 2, foundry, Phila.	$51.56	$51.56	$51.56	$40.97
No. 2, Valley furnace	46.50	46.50	46.50	36.50
No. 2, Southern Cin'ti	49.47	49.47	49.47	40.24
No. 2, Birmingham	43.38	43.38	43.38	34.88
No. 2, foundry, Chicago†	46.00	46.00	46.00	36.00
Basic del'd Philadelphia	50.76	50.76	50.76	40.47
Basic, Valley furnace	46.00	46.00	46.00	36.00
Malleable, Chicago†	46.50	46.50	46.50	36.50
Malleable, Valley	46.50	46.50	46.50	36.50
Charcoal, Chicago	73.78	73.78	73.78	56.04
Ferromanganese‡	161.71	161.71	161.71	145.00

† The switching charge for delivery to foundries in the Chicago district is $1 per ton.
‡ Average of U. S. prices quoted on Ferroalloy page.

Scrap (per gross ton)				
Heavy melt'g steel, P'gh.	$42.75	$42.75	$42.75	$40.00
Heavy melt'g steel, Phila.	44.50	44.50	45.00	43.00
Heavy melt'g steel, Ch'go	41.75	41.75	41.75	38.75
No. 1, hy. comp. sh't, Det.	38.00	38.00	38.00	34.75
Low phos. Young'n	47.75	47.75	47.75	47.25
No. 1, cast, Pittsburgh	70.00	70.00	70.00	52.00
No. 1, cast, Philadelphia	66.50	66.50	66.50	53.00
No. 1, cast, Chicago	72.50	72.50	71.00	52.50
Coke, Connellsville: (per net ton at oven)				
Furnace coke, prompt	$15.00	$15.00	$15.00	$12.50
Foundry coke, prompt	17.00	17.00	17.00	14.00
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electro, Conn.	23.50	23.50	23.50	21.50
Copper, Lake Conn.	23.625	23.625	23.625	21.625
Tin, Grade A, New York	$1.03	$1.03	$1.03	80.00
Zinc, East St. Louis	17.50	17.50	15.50	10.50
Lead, St. Louis	21.30	21.30	19.30	14.80
Aluminum, virgin	17.00	17.00	17.00	15.00
Nickel, electrolytic	42.90	42.90	42.90	37.67
Magnesium, ingot	20.50	20.50	20.50	20.50
Antimony, Laredo, Tex.	38.50	38.50	38.50	33.00

Composite Prices . .

Starting with the issue of Apr. 22, 1943, the weighted finished steel index was revised for the years 1941, 1942, and 1943. See explanation of the change on p. 90 of the Apr. 22, 1943, issue. Index revised to a quarterly basis as of Nov. 16, 1944; for details see p. 98 of that issue. The finished steel composite price for the current quarter is an estimate based on finished steel shipments for the previous quarter. This figure will be revised when shipments for this quarter are compiled.

	FINISHED STEEL (Base Price)	PIG IRON	SCRAP STEEL
Nov. 23, 1948	3.75628¢ per lb.	$46.82 per gross ton	$43.00 per gross ton
One week ago	3.75628¢ per lb.	$46.82 per gross ton	$43.00 per gross ton
One month ago	3.75628¢ per lb.	$46.82 per gross ton	$43.16 per gross ton
One year ago	3.19541¢ per lb.	$37.06 per gross ton	$40.58 per gross ton

	HIGH	LOW
1948	3.75700¢ July 27	3.22566¢ Jan. 1
1947	3.19541¢ Oct. 7	2.87118¢ Jan. 7
1946	2.83599¢ Dec. 31	2.54490¢ Jan. 1
1945	2.44104¢ Oct. 2	2.54490¢ Jan. 2
1944	2.30837¢ Sept. 5	2.21189¢ Oct. 5
1943	2.29176¢	2.29176¢
1942	2.28249¢	2.28249¢
1941	2.43078¢	2.43078¢
1940	2.30467¢ Jan. 2	2.24107¢ Apr. 16
1939	2.35367¢ Jan. 3	2.26689¢ May 16
1938	2.58414¢ Jan. 4	2.27207¢ Oct. 18
1937	2.58414¢ Mar. 9	2.32263¢ Jan. 4
1936	2.32263¢ Dec. 28	2.05200¢ Mar. 10
1935	2.07642¢ Oct. 1	2.06432¢ Jan. 8
1934	2.15367¢ Apr. 24	1.95757¢ Jan. 2
1933	1.95578¢ Oct. 3	1.75836¢ May 2
1932	1.89196¢ July 5	1.83901¢ Mar. 1
1931	1.99626¢ Jan. 13	1.86586¢ Dec. 29
1930	2.25488¢ Jan. 7	1.97319¢ Dec. 9
1929	2.31773¢ May 28	2.26498¢ Oct. 29

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold-rolled sheets and strip, representing major portion of finished steel shipments. Index recapitulated in Aug. 28, 1941, issue.

	HIGH	LOW
1948	$46.82 Oct. 12	$39.58 Jan. 6
1947	37.98 Dec. 30	30.14 Jan. 7
1946	30.14 Dec. 10	25.37 Jan. 1
1945	25.37 Oct. 23	23.61 Jan. 2
1944	$23.61	$23.61
1943	23.61	23.61
1942	23.61	23.61
1941	$23.61 Mar. 20	$23.45 Jan. 2
1940	23.45 Dec. 23	22.61 Jan. 2
1939	22.61 Sept. 19	20.61 Sept. 12
1938	23.25 June 21	19.61 July 6
1937	23.25 Mar. 9	20.25 Feb. 16
1936	19.74 Nov. 24	18.73 Aug. 11
1935	18.84 Nov 5	17.83 May 14
1934	17.90 May 1	16.90 Jan. 27
1933	16.90 Dec. 5	13.56 Jan. 3
1932	14.81 Jan. 5	13.56 Dec. 6
1931	15.90 Jan. 6	14.79 Dec. 15
1930	18.21 Jan. 7	15.90 Dec. 16
1929	18.71 May 14	18.21 Dec. 17

Based on averages for basic iron at valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

	HIGH	LOW
1948	$43.16 July 27	$39.75 Mar. 9
1947	42.58 Oct. 28	29.50 May 20
1946	31.17 Dec. 24	19.17 Jan. 1
1945	19.17 Jan. 2	18.92 May 22
1944	19.17 Jan. 11	15.76 Oct. 24
1943	$19.17	$19.17
1942	19.17	19.17
1941	$22.00 Jan. 7	$19.17 Apr. 10
1940	21.83 Dec. 30	16.04 Apr. 9
1939	22.50 Oct. 3	14.08 May 16
1938	15.00 Nov. 22	11.00 June 7
1937	21.92 Mar. 30	12.67 June 9
1936	17.75 Dec. 21	12.67 June 8
1935	13.42 Dec. 10	10.33 Apr. 29
1934	13.00 Mar. 13	9.50 Sept. 25
1933	12.25 Aug. 8	6.75 Jan. 3
1932	8.50 Jan. 12	6.43 July 5
1931	11.33 Jan. 6	8.50 Dec. 29
1930	15.00 Feb. 18	11.25 Dec. 9
1929	17.58 Jan. 29	14.08 Dec. 8

Based on No. 1 heavy melting steel scrap quotations to consumers at Pittsburgh, Philadelphia and Chicago.

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Iron and Steel Prices . . .

Steel prices shown here are f.o.b. producing points in cents per pound unless otherwise indicated. Extras apply. (1) Commercial quality sheet grade; prices, 0.25¢ above base. (2) Commercial quality grade. (3) Widths up to 12-in. inclusive. (4) 0.25 carbon and less. (5) Cokes, 1.25 lb, deduct 20¢ per base box. (6) 18 gage and heavier. (7) For straight length material only from producers to fabricators. (8) Also shafting. For quantities of 40,000 lb and over. (9) Carload lot in manufacturing trade. (10) Hollowware enameling, gages 29 to 31 only. (11) Produced to dimensional tolerances in AISI Manual Sec. 6. (12) Slab prices subject to negotiation in most cases. (13) San Francisco only. (14) Los Angeles only. (15) San Francisco and Los Angeles only. (16) Seattle only. (17) Seattle and Los Angeles only.

PRODUCTS	Base prices at producing points apply to the sizes and grades produced in these areas														
	Pittsburgh	Chicago	Gary	Cleveland	Birmingham	Buffalo	Youngstown	Sparrows Point	Granite City	Middletown, Ohio		Detroit	Johnstown	Seattle, S. Frisco, LosAngeles	Fontana
INGOTS Carbon forging	$50.00														
Alloy	$51.00						(per net ton)								
BILLETS, BLOOMS, SLABS Carbon, rerolling[12]	$52.00				$52.00	$52.00	(per net ton)						$52.00		
Carbon forging billets	$61.00	$61.00	$61.00	$61.00	$61.00	$61.00	(per net ton)						$61.00		
Alloy	$63.00	$63.00				$63.00	(Bethlehem, Canton, Massillon = $63.00) (per net ton)								
PIPE SKELP	3.25						3.25				Warren =3.25				
WIRE RODS	3.40 to 4.15	3.40 to 3.90		3.40	3.40		3.65	3.50			Worcester 3.70		3.40	4.05[13] 4.10[14]	
SHEETS Hot-rolled[6]	3.25 to 3.30	3.25	3.25	3.25-3.30	3.25	3.25	3.25	3.25		Warren, Ashland =3.25		3.45		3.95[15]	5.65
Cold-rolled[1]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.70	4.00	Warren 4.00	4.20		Pittsburg, Cal. 4.95	
Galvanized (10 gage)	4.40	4.40	4.40		4.40			4.40	Canton =4.40	4.40	Ashland =4.40			5.15[15]	
Enameling (12 gage)	4.40	4.40	4.40	4.40			4.40		4.60	4.40		4.70			
Long ternes[2] (10 gage)	4.80		4.80							4.80					
STRIP Hot-rolled[3]	3.25 to 3.30	3.25 to 3.30	3.25	3.25 to 3.30	3.25	3.25	3.25	3.25		3.25	Warren =3.25	3.45		4.00 to 4.25	5.90
Cold-rolled[4]	4.00	4.25		4.00	4.00	4.00	4.00	4.00		New Haven 4.50 Warren =4.00 to 4.25		4.20 to 4.50			7.10
TINPLATE Cokes, 1.50 lb.[5] base box	$6.80	$6.80	$6.80		$6.90			$6.90	$7.00	Warren, Ohio =$6.80				Pittsburg, Cal. =$7.55	
Electrolytic 0.25, 0.50, 0.75 lb. box	Deduct $1.00, 80¢ and 60¢ respectively from 1.50 lb. coke base box price														
TERNES MFG., special coated	Deduct 90¢ from 1.50 lb. coke base box price														
BLACKPLATE CANMAKING 55-70 lb, 75-95 lb, 100-128 lb	Deduct $1.60, $1.70 and $1.60 respectively from 1.50 lb. coke base box price														
BLACKPLATE, h.e., 29 ga.[10]	4.75	4.75	4.75					4.85							
BARS Carbon Steel	3.35 to 3.55	3.35	3.35	3.35	3.35	3.35	3.35	3.35		3.35	Canton =3.35	3.55	3.35	4.05 to 4.10	5.30
Reinforcing (billet)[7]	3.35	3.35	3.35	3.35	3.35	3.35	3.35	3.35			Canton =3.35		3.35	4.05 to 4.10	5.30
Cold-finished[8]	3.95 to 4.00	4.00	4.00	4.00		4.00	4.00					4.30			
Alloy, hot-rolled	3.75	3.75	3.75			3.75	3.75	Bethlehem, Canton, Massillon =3.75				4.05	3.75	4.80[14]	5.50
Alloy cold-drawn	4.65 to 4.75	4.65	4.65	4.65		4.65	4.65	Massillon =4.65			Worcester 4.95				
PLATE Carbon steel[11]	3.40 to 3.60	3.40	3.40	3.40 to 3.60	3.40	3.45	3.40	3.45 Coatesville =3.75, Claymont =3.95				3.65	3.45	4.30[16]	5.80
Floor plates	4.55	4.55		4.55	Cons	hohocken	=3.95	Geneva =3.40, Harrisburg =6.50							
Alloy	4.40	4.40						Cons hohocken =4.55							
SHAPES, Structural	3.25 to 3.30	3.25	3.25		3.25	3.30	Bethlehem =3.30, Geneva, Utah =3.25						3.30	3.85 to 4.30	5.75
MANUFACTURERS' WIRE[9] Bright	4.15 to 4.50	4.15 to 4.65		4.15	4.15		4.15	4.25	Duluth =4.15, Worcester =4.45				4.15	5.15[13]	
Spring (high carbon)	5.20	5.20		5.20				5.30	Worcester =5.50 New Haven, Trenton =5.50				5.20	Duluth = 5.20-6.15	
PILING, Steel sheet	4.05	4.05				4.05									

STAINLESS STEELS

Base prices, in cents per pound, f.o.b. producing point

Product	Chromium Nickel						Straight Chromium		
	301	302	303	304	316	347	410	416	430
Ingots, rerolling	12.75	13.50	15.00	14.50	22.75	20.00	11.25	13.75	11.50
Slabs, billets, rerolling	17.00	18.25	20.25	19.25	30.25	26.75	15.00	18.50	15.25
Forging discs, die blocks, rings	30.50	30.50	33.00	32.00	49.00	41.00	24.50	25.00	25.00
Billets, forging	24.25-26.50	24.25-26.50	26.25-28.75	25.50-27.75	39.00-42.75	32.75-35.75	19.50-21.50	20.00-21.75	20.00-21.75
Bars, wire, structurals	28.50	28.50	31.00	30.00	46.00	38.50	23.00	23.50	23.50
Plates	32.00	32.00	34.00	34.00	50.50	44.00	26.00	26.50	26.50
Sheets	37.50-40.75	37.50-40.75	39.50-43.00	39.50-43.00	53.00-57.25	50.00-54.00	33.00	33.50	35.50 .....
Strip, hot-rolled	24.25	25.75	30.00	27.75	46.00	38.75	21.25	28.00	21.75
Strip, cold-rolled	30.50-30.75	33.00-33.50	36.50-39.50	35.00-35.75	55.00-57.25	48.50-50.00	27.00	33.50	27.50 .....

ELECTRODES

Cents per lb, f.o.b. plant, threaded electrodes with nipples, unboxed

Diameter in in.	Length in in.	
Graphite		
17, 18, 20	60, 72	16.00¢
8 to 16	48, 60, 72	16.50¢
7	48, 60	17.75¢
6	48, 60	19.00¢
4, 5	40	19.50¢
3	40	20.50¢
2½	24, 30	21.00¢
2	24, 30	23.00¢
Carbon		
40	100, 110	7.50¢
35	65, 110	7.50¢
30	65, 84, 110	7.50¢
24	72 to 104	7.50¢
17 to 20	84, 90	7.50¢
14	60, 72	8.00¢
10, 12	60	8.25¢
8	60	8.50¢

TOOL STEEL

F.o.b. mill

W	Cr	V	Mo	Co	Base per lb
18	4	1	—	—	90.5¢
18	4	1	—	5	$1.42
18	4	2	—	—	$1.025
1.5	4	1.5	8	—	65¢
6	4	2	6	—	69.5¢

High-carbon-chromium ..... 52¢
Oil harden manganese ..... 29¢
Special carbon ..... 26.5¢
Extra carbon ..... 22¢
Regular carbon ..... 19¢

Warehouse prices on and east of Mississippi are 2½¢ per lb higher. West of Mississippi, 4½¢ higher.

ELECTRICAL SHEETS

Base, HR cut lengths, f.o.b. mill

	Cents per lb
Armature	5.45
Electrical	5.95
Motor	6.70 to 9.20
Dynamo	7.50 to 10.00
Transformer 72	8.05 to 11.80
Transformer 65	8.60 to 12.35
Transformer 58	9.30 to 13.05
Transformer 52	10.10

RAILS, TRACK SUPPLIES

F.o.b. mill

Standard rails, 100 lb and heavier, No. 1 quality, per 100 lb ..... $3.20†
Joint bars, 100 lb 4.25
Light rails (from billets) per 100 lb 3.55

	Base Price cents per lb
Track spikes	5.35
Axles	5.20
Screw spikes	8.00
Tie plates	4.05
Tie plates, Pittsburg, Calif.*	4.20
Track bolts, untreated	8.25
Track bolts, heat treated, to railroads	8.50

*Seattle, add 30¢.
† CF&I $3.35; Inland $3.50.

C-R SPRING STEEL

Base per pound f.o.b. mill

0.26 to 0.40 carbon ..... 4.00¢
0.41 to 0.60 carbon ..... 5.50¢
0.61 to 0.80 carbon ..... 6.10¢
0.81 to 1.05 carbon ..... 8.05¢
1.06 to 1.35 carbon ..... 10.35¢
Worcester, add 0.30¢.

CLAD STEEL

Base prices, cents per pound

Stainless clad	Plate	Sheet
No. 304, 20 pct, f.o.b.		
Coatesville, Pa.	*26.50	
Washington, Pa.	*26.50	*22.50
Claymont, Del.	*26.50	
Conshohocken, Pa.		*22.50
Nickel-clad		
10 pct f.o.b. Coatesville, Pa.	27.50	
Inconel-clad		
10 pct, f.o.b. Coatesville.	36.00	
Monel-clad		
10 pct, f.o.b. Coatesville.	29.00	
Alumnized steel sheets		
Hot dip, 20 gage, f.o.b. Butler, Pa.	....	9.25

* Includes annealing and pickling, or sandblasting.

MERCHANT WIRE PRODUCTS

To the dealer, f.o.b. mill

	Base Column	Pittsburg, Calif.
Standard & coated nails*	103	123
Galvanized nails*	103	123
Woven wire fence†	109	132
Fence posts, carloads††	114	
Single loop bale ties	106	130
Galvanized barbed wire**	123	143
Twisted barbless wire	123	...

* Pgh., Chi., Duluth; Worcester, 6 columns higher. † 15½ gage and heavier. ** On 80 rod spools, in carloads. †† Duluth only.

	Base per 100 lb	Pittsburg Calif.
Annealed fence wire‡	$4.80	$5.75
Annealed, galv. fencing‡	5.25	6.20
Cut nails, carloads‡‡	6.75	....

‡ Add 30¢ at Worcester; 10¢ at Sparrows Pt.
‡‡ Less 20¢ to jobbers.

HIGH STRENGTH, LOW ALLOY STEELS

Mill base prices, cents per pound

Steel	Aldecor	Corten	Double Strength No. 1	Dynalloy	HI Steel	Mayari R	Otiscoloy	Yoloy	NAX High Tensile
Producer	Republic	Carnegie-Illinois, Republic	Republic	Alan Wood	Inland	Bethlehem	Jones & Laughlin	Youngstown Sheet & Tube	Great Lakes Steel
Plates	5.20	5.20	5.20	5.30	5.20	5.30	5.20	5.20	5.65
Sheets									
Hot-rolled	4.95	4.95	4.95	5.25	4.95	4.95	4.95	4.95	5.25
Cold-rolled	6.05	6.05	6.05	....	6.05	6.05	6.05	6.05	6.35
Galvanized	....	6.75	....	....	....	6.75	....	....	....
Strip									
Hot-rolled	4.95	4.95	4.95	....	4.95	4.95	4.95	4.95	5.25
Cold-rolled	....	....	6.05	....	....	6.05	6.05	....	6.35
Shapes	....	4.95	....	....	4.95	5.05	4.95	....	....
Beams	....	4.95	....	....	....	....	....	....	....
Bars									
Hot-rolled	5.10	5.10	5.10	....	5.10	5.10	5.10	....	5.40
Bar shapes	....	5.10	....	....	5.10	5.10	5.10	....	....

UNIVERSITY OF MICHIGAN LIBRARIES

PIPE AND TUBING

Base discounts, f.o.b. mills, Base price, $200.00 per net ton.

Standard, threaded and coupled

Steel, buttweld	Black	Galv.
½-in.	43 to 41	20 to 18
¾-in.	46 to 44	24 to 22
1-in.	48½ to 46½	27 to 25
1¼-in.	49 to 47	27½ to 25½
1½-in.	49½ to 47½	28 to 26
2-in.	50 to 48	28½ to 26½
2½ to 3-in.	50½ to 49½	29 to 27
Steel, lapweld		
2-in.	39½	17½
2½ to 3 in.	39½	21½
3½ to 6 in.	46½ to 42	20½ to 24½
Steel, seamless		
2-in.	38½ to 27	16½ to 5
2½ to 3-in.	41½ to 35	19½ to 10½
3½ to 6-in.	43½ to 38½	21½ to 16½
Wrought Iron, buttweld		
½-in.	+20½	+52½
¾-in.	+10½	+41½
1 & 1¼-in.	+ 4½	+32½
2-in.	— 1½	+29
3-in.	— 2	+28½
Wrought Iron, lapweld		
2-in.	+ 7½	+36½
2½ to 3½-in.	+ 5	+32
4-in.	list	+26
4½ to 8-in.	+ 2	+27½
Extra Strong, plain ends		
Steel, buttweld		
½-in.	42 to 40	20½ to 18½
¾-in.	46 to 44	24½ to 22½
1-in.	48 to 46	27½ to 25½
1¼-in.	48½ to 46½	28 to 26
1½-in.	49 to 47	28½ to 26½
2-in.	49½ to 47½	29 to 27
2½ to 3-in.	50 to 48	29½ to 27½
Steel, lapweld		
2-in.	39½	18½
2½ to 3-in.	44½	23½
3½ to 6-in.	48 to 44	23 to 27
Steel, seamless		
2-in.	37½ to 32½	16½ to 11½
2½ to 3-in.	41½ to 36½	20½ to 15½
3½ to 6-in.	45	24
Wrought Iron, buttweld		
½-in.	+16	+46½
¾-in.	+ 9½	+39½
1 to 2-in.	— 1½	+28½
Wrought Iron, lapweld		
2-in.	+ 4½	+33
2½ to 4-in.	— 5	+21½
4½ to 6-in.	— 1	+26

For threads only, buttweld, lapweld and seamless pipe, one point higher discount (lower price) applies. For plain ends, buttweld, lapweld and seamless pipe 3-in. and smaller, three points higher discount (lower price) applies, while for lapweld and seamless 3½-in. and larger four points higher discount (lower price) applies. On buttweld and lapweld steel pipe, jobbers are granted a discount of 5 pct. On l.c.l. shipments, prices are determined by adding 25 pct and 30 pct and the carload freight rate to the base card.

BOILER TUBES

Seamless steel and electric welded commercial boiler tubes and locomotive tubes, minimum wall. Prices per 100 ft at mill in carload lots, cut length 4 to 24 ft inclusive.

OD in.	Gage BWG	Seamless H.R.	Seamless C.R.	Electric Weld H.R.	Electric Weld C.D.
2	13	19.18	22.56	18.60	21.89
2½	12	25.79	30.33	25.02	29.41
3	12	28.68	33.76	27.82	32.74
3½	11	35.85	42.20	34.78	40.94
4	10	44.51	52.35	43.17	50.78

CAST IRON WATER PIPE

Per net ton

6 to 24-in., del'd Chicago $106.70
6 to 24-in., del'd N. Y. ..... 103.50 to 108.40
6 to 24-in., Birmingham 93.50
6-in. and larger, f.o.b. cars, San Francisco, Los Angeles, for all rail shipment; rail and water shipment less 120.30

Class "A" and gas pipe, $5 extra; 4-in. pipe is $5 a ton above 6-in.

BOLTS, NUTS, RIVETS, SET SCREWS

Consumer Prices

(Bolts and nuts f.o.b. mill Pittsburgh, Cleveland, Birmingham or Chicago)

Base discount less case lots

Machine and Carriage Bolts

	Pct Off List
½ in. & smaller x 6 in. & shorter	35
9/16 & ⅝ in. x 6 in. & shorter	37
¾ in. & larger x 6 in. & shorter	34
All diam, longer than 6 in.	30
Lag, all diam over 6 in. longer	35
Lag, all diam x 6 in. & shorter	37
Plow bolts	47

Nuts, Cold Punched or Hot Pressed

(Hexagon or Square)

½ in. and smaller	35
9/16 to 1 in. inclusive	34
1⅛ to 1½ in. inclusive	32
1⅝ in. and larger	27

On above bolts and nuts, excepting plow bolts, additional allowance of 15 pct for full container quantities. There is an additional 5 pct allowance for carload shipments.

Semifin. Hexagon Nuts

	USS	SAE
7/16 in. and smaller	..	41
½ in. and smaller	38	..
½ in. through 1 in.	..	39
9/16 in. through 1 in.	37	..
1⅛ in. through 1½ in.	35	37
1⅝ in. and larger	28	..

In full case lots, 15 pct additional discount.

Stove Bolts

Packages, nuts separate	$61.75
In bulk	70.00

Large Rivets

(½ in. and larger)

	Base per 100 lb
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	$6.75
F.o.b. Lebanon, Pa.	6.75

Small Rivets

(7/16 in. and smaller)

	Pct off List
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	48

Cap and Set Screws

(In packages)	Pct Off List
Hexagon head cap screws, coarse or fine thread, up to and incl. 1 in. x 6 in., SAE 1020, bright	46
¾ to 1 in. x 6 in., SAE (1035), heat treated	35
Set screws, oval points	
Milled studs	19
Flat head cap screws, listed sizes	5
Fillister head cap, listed sizes	28

FLUORSPAR

Washed gravel fluorspar, f.o.b. cars, Rosiclare, Ill.

	Base price per net ton
Effective CaF, Content:	
70% or more	$37.00
60% or less	34.00

LAKE SUPERIOR ORES

(51.50% Fe, Natural Content, Delivered Lower Lake Ports)

	Per Gross Ton
Old range, Bessemer	$6.60
Old range, nonbessemer	6.45
Mesabi, bessemer	6.35
Mesabi, nonbessemer	6.20
High phosphorus	6.20

Increases or decreases in freight rates, dock handling charges and taxes after Apr. 1, 1948, are to be added to above prices.

METAL POWDER

Per pound, f.o.b. shipping point, in ton lots, for minus 100 mesh.

Swedish sponge iron c.i.f. New York, ocean bags	7.9¢ to 9.0¢
Domestic sponge iron, 98+% Fe, carload lots	9.0¢ to 15.0¢
Electrolytic iron, annealed, 99.5+% Fe	19.5¢ to 39.5¢
Electrolytic iron, unannealed, minus 325 mesh, 99+% Fe	48.5¢
Hydrogen reduced iron, minus 300 mesh, 98+% Fe	63.0¢ to 80.0¢
Carbonyl iron, size 5 to 10 microns, 98%, 99.8%+ Fe	90.0¢ to $1.75
Aluminum	30.00¢
Antimony	51.17¢
Brass, 10 ton lots	27.25 to 37.25¢
Copper, electrolytic	33.625¢
Copper, reduced	34.25¢
Cadmium	$2.55
Chromium, electrolytic, 99% min.	$3.50
Lead	27.80¢
Manganese	55.00¢
Molybdenum, 99%	$2.65
Nickel, unannealed	66.00¢
Nickel, spherical, minus 30 mesh, unannealed	68.00¢
Silicon	34.00¢
Solder powder	8.5¢ plus metal cost
Stainless steel, 302	75.0¢
Tin	$1.155
Tungsten, 99%	$2.90
Zinc, 10 ton lots	17.75 to 22.25¢

COKE

	Net Ton
Furnace, beehive (f.o.b. oven) Connellsville, Pa.	$14.50 to $15.50
Foundry, beehive (f.o.b. oven) Connellsville, Pa.	$16.00 to $18.00
Foundry, Byproduct	
Buffalo	$22.75 to $23.10
Chicago, del'd	23.90
Chicago, f.o.b.	20.85
Detroit, f.o.b.	19.40
New England, del'd	22.75
Seaboard, N. J., f.o.b.	21.50
Philadelphia, f.o.b.	20.55
Swedeland, Pa., f.o.b.	20.50
Painesville, Ohio, f.o.b.	20.90
Erie, del'd	19.95
Cleveland, del'd	22.45
Cincinnati, del'd	21.40
St. Paul, del'd	23.17
St. Louis, del'd	20.98
Birmingham, del'd	18.66

REFRACTORIES

(F.o.b. Works)

Fire Clay Brick	*Carloads, Per 1000*
First quality, Pa., Md., Ky., Mo. (except Salina, Pa., add $5)	$80.00
No. 1 Ohio	74.00
Sec. quality, Pa., Md., Ky., Mo.	74.00
No. 2 Ohio	66.00
Ground fire clay, net ton, bulk (except Salina, Pa., add $1.50)	11.50
Silica Brick	
Mt. Union, Pa., Ensley, Ala.	$80.00
Childs, Pa.	84.00
Hays, Pa.	85.00
Chicago District	89.00
Western, Utah and Calif.	95.00
Super Duty, Hays, Pa., Athens, Tex.	85.00
Silica cement, net ton, bulk, Eastern (except Hays, Pa.)	$13.75 to 14.00
Silica cement, net ton, bulk, Hays, Pa.	16.00
Silica cement, net ton, bulk, Ensley, Ala.	15.00
Silica cement, net ton, bulk, Chicago District	14.75
Silica cement, net ton, bulk, Utah and Calif.	21.00
Chrome Brick	*Per Net Ton*
Standard chemically bonded, Balt., Chester	$69.00
Magnesite Brick	
Standard, Balt. and Chester	$91.00
Chemically bonded, Balt. and Chester	80.00
Grain Magnesite	
Std. ⅜-in. grains	
Domestic, f.o.b. Balt. and Chester, in bulk, fines removed	$56.50
Domestic, f.o.b. Chewelah, Wash., in bulk with fines	$30.50 to 31.00
in sacks with fines	35.00 to 35.50
Dead Burned Dolomite	
F.o.b. producing points in Pennsylvania, West Virginia and Ohio, per net ton, bulk. Midwest, add 10¢; Missouri Valley, add 20¢	$12.25

WAREHOUSE PRICES

Base prices, f.o.b. warehouse, per 100 lb.
(Metropolitan area delivery, add 15¢ to base, except New York, add 20¢)

CITIES	SHEETS			STRIP		PLATES	SHAPES	BARS		ALLOY BARS			
	Hot-Rolled	Cold-Rolled (15 gage)	Galvanized (10 gage)	Hot-Rolled	Cold-Rolled		Standard Structural	Hot-Rolled	Cold-Finished	Hot-Rolled, A 4615 As-rolled	Hot-Rolled, A 4140-50 Ann.	Cold-Drawn, A 4615 As-rolled	Cold-Drawn, A 4140-50 Ann.
Philadelphia	$5.15-5.71	$6.31-6.57	$7.27-7.47	$5.35-5.66	$6.51	$5.37-5.52	$5.09-5.24	$5.35-5.57	$6.16-6.31	$9.14	$9.29	$10.54	$10.69
New York	5.40-5.98	6.28-6.43	7.25-7.73	5.58-5.88	6.48-6.73	5.78	5.32-5.58	5.53-5.63	6.18-6.38	9.17-9.53	9.32-9.68	10.40-10.77	10.55-10.92
Boston	5.48-5.64	6.39	7.56-7.69	5.54-5.89	6.75-6.79	5.74	5.39-5.54	5.48-5.59	6.24-6.34	9.40-9.44	9.55-9.59	10.84-10.94	10.92-11.09
Baltimore	5.28	6.18	7.15-7.38	5.34	....	5.53	5.33-5.39	5.39	6.13	....	....	....	....
Chicago	4.85-5.10	5.75-5.95	6.95-7.05	4.85-5.30	6.15	5.10	4.90	4.90	5.70	9.35	9.60	10.80	11.05
Milwaukee	5.02-5.07	5.92	7.12-7.22	5.02-5.37	6.32	5.22-5.27	5.07	5.07	5.87	9.15-9.17	9.32	10.52-10.57	10.67-10.72
Norfolk	5.75	....	....	....	....	6.00	6.00	6.00	....	....	....	....	....
Cleveland	4.98-5.20	5.75[1]-6.04[1]	7.18-7.24	5.02-5.65	6.70	5.35-5.54	5.16-5.42	5.15-5.34	5.70-5.95	9.14-9.66	9.29-9.89	11.05	11.30
Buffalo	4.85-5.10	5.75-5.85	7.55-7.70	5.55-5.56	6.35	5.45-5.46	5.10	5.15-5.20	5.90-6.05	9.05-9.35	9.40-9.50	10.75	20.90
Detroit	5.20-5.55	6.05-6.50	7.45	5.25-5.70	6.25-6.55	5.50-5.55	5.30-5.37	5.30-5.52	6.02-6.07	9.31-9.55	9.20-9.47	10.72-10.95	10.87-11.10
Cincinnati	5.14-5.36[8]	5.82-6.21[8]	6.97-7.45	5.25-5.62[8]	6.31	5.50-5.71[8]	5.30-5.47[8]	5.30-5.62[8]	6.06-6.17[8]	9.31-9.35	9.50-9.51	10.75-10.76	10.90-10.91
St. Louis	5.19	6.04-6.09	7.29-7.39	5.19-5.79	6.49	5.39-5.44	5.24	5.24	6.04	9.69	9.94	11.14	11.39
Pittsburgh	4.85-4.90	5.75[1]	6.95-7.05	5.00-5.35	5.95	5.05-5.25	4.90-5.15	4.90-5.10	5.65-5.80	9.35	9.60	10.40	10.55-10.80
St. Paul	5.41	6.31	7.30-7.61	5.41	....	5.68	5.46	5.46	6.26	9.91	10.10	11.36	11.61
Omaha	5.92	....	9.18	5.92	....	6.17	5.97	5.97	6.77	....	....	....	....
Birmingham	5.05[1]	6.36	6.45	5.05[11]	6.38	5.25[11]	5.00[11]	5.00[11]	6.66	....	....	....	....
Houston	6.40		8.80	6.75	....	6.35	6.20	6.40	7.60	9.80	9.65	10.75	10.95
Los Angeles	6.30-6.40	7.85[1]-7.90	7.95-8.55	6.60-6.66	9.35[5]	5.95-6.10	5.75-5.90	6.05	7.85[13]-7.95	10.90	10.85	12.40	12.65
San Francisco	5.95[8]	7.15[2]	8.25-8.85	6.75[8]	8.25	6.30-7.60	5 90-6.90	5.90	7.55	10.90	10.85	12.40	12.65
Portland	6.50[4]	8.00[2]	8.15[2] 8.45[2]	6.85[4]	....	6.30[4]	6.25[4]	6.25[4]	8.25[4]	....	10.45[15]	....	12.05[15]
Seattle	6.20[4]-6.30[4]	7.75[2]-7.85[2]	7.65 8.00	6.55[4]-6.65[4]	....	6.20-6.30	6.15-6.25	6.05[4]-6.15[4]	8.00[14]-8.10[14]	....	10.30[15]-10.40[15]	....	12.00[15]-12.05[15]
Salt Lake City	6.15-8.00	7.35	7.90-9.06	7.10-7.45	....	5.75-6.65	6.65-7.00	6.95-7.25	7.55-8.40	....	....	....	....

BASE QUANTITIES

Standard unless otherwise keyed on prices.

HOT-ROLLED: Sheets, strip, plates, shapes and bars, 400 to 1999 lb.

COLD-ROLLED: Sheets, 400 to 1999 lb; strip, extras on all quantities bars 1000 lb and over.

ALLOY BARS: 1000 to 1999 lb.

GALVANIZED SHEETS: 450 to 1499 lb.

EXCEPTIONS: (1) 400 to 1499 lb; (2) 450 to 1499 lb; (3) 300 to 4999 lb; (4) 300 to 9999 lb; (5) 2000 lb and over; (6) 1000 lb and over; (7) 400 to 14,999 lb; (8) 400 lb and over; (9) 500 to 1999 lb; (10) 500 to 999 lb; (11) 400 to 3999 lb; (12) 450 to 3749 lb; (13) 400 to 1999 lb; (14) 1500 lb and over; (15) 1000 to 4999 lb; (16) 4000 lb and over; (17) up to 1999 lb.

PIG IRON PRICES

Dollars per gross ton. Delivered prices represent minimums. Delivered prices do not include 3 pct tax on freight.

PRODUCING POINT PRICES						DELIVERED PRICES† (BASE GRADES)							
Producing Point	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.	Consuming Point	Producing Point	Freight Rate	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.
Bethlehem	48.00	....	....	....	....	Boston	Everett	$0.50 Arb.	....	49.50	50.00	....	....
Birmingham	42.88	43.38	....	....	....	Boston	Steelton	6.27	54.27	54.77	55.27	55.77	60.27
Buffalo	47.00-48.00*	47.00-48.00*	47.50-48.50*	....	....	Brooklyn	Bethlehem	3.90	51.90	....	....	....	....
Chicago	46.00	46.00	46.50	47.00	....	Cincinnati	Birmingham	6.09	48.97	49.47	....	....	....
Cleveland	46.00	46.50	46.50	47.00	51.00	Jersey City	Bethlehem	2.39	50.39	....	....	....	....
Duluth	46.00	46.00	46.50	47.00	....	Los Angeles	Provo	6.93	52.93	53.43	....	....	....
Erie	45.50	46.00	46.50	47.00	....	Mansfield	Cleveland-Toledo	3.03	49.03-48.53	49.53-49.03	50.03	54.03	....
Everett	....	49.50	50.00	....	....	Philadelphia	Bethlehem	2.21	50.21	....	....	....	....
Granite City	47.90	48.40	48.90	....	....	Philadelphia	Swedeland	1.31	51.31	51.81	52.31	52.81	....
Ironton, Utah	62.00	62.50	....	....	....	Philadelphia	Steelton	2.81	50.81	51.31	51.81	52.31	56.81
Lone Star, Texas	....	75.00†	....	....	....	San Francisco	Provo	6.93	52.93	53.43	....	....	....
Neville Island	46.00	46.50	46.50	....	....	Seattle	Provo	6.93	52.93	53.43	....	....	....
Provo	46.00	46.50	....	....	....	St. Louis	Granite City	0.75 Arb.	48.65	49.15	49.65	....	....
Sharpsville	46.00	46.50	46.50	47.00	....								
Steelton	48.00	48.50	49.00	49.50	54.00								
Struthers, Ohio	46.00	....	....	....	....								
Swedeland	50.00	50.50	51.00	51.50	....								
Toledo	45.50	46.00	46.50	47.00	....								
Troy, N. Y.	....	....	....	....	54.00								
Youngstown	46.00	46.50	46.50	....	....								

* Republic Steel Corp. price: Basis: pig iron at Buffalo set by average price of No. 1 hvy. mlt. steel scrap at Buffalo as shown in last week's issue of THE IRON AGE. Price is effective until next Sunday midnight.
† Low Phos, Southern Grade.

Producing point prices are subject to switching charges; silicon differential (not to exceed 50¢ per ton for each 0.25 pct silicon content in excess of base grade which is 1.75 to 2.25 pct); phosphorus differentials, a reduction of 38¢ per ton for phosphorus content of 0.70 pct and over; manganese differentials, a charge not to exceed 50¢ per ton for each 0.50 pct manganese content in excess of 1.00 pct. $2 per ton extra may be charged for 0.5 to 0.75 pct nickel content and $1 per ton extra for each additional 0.25 pct nickel.

Silvery iron (blast furnace) silicon 6.00 to 6.50 pct. C/L per g.t., f.o.b. Jackson, Ohio —$59.50; f.o.b. Buffalo $60.75. Add $1.25 per ton for each additional 0.50 pct Si. up to 12 pct. Add 50¢ per ton for each 0.50 pct Mn over 1.00 pct. Add $1.00 per ton for 0.75 pct or more P. Bessemer ferrosilicon prices are $1.00 per ton above silvery iron prices of comparable analysis.

Charcoal pig iron base price for low phosphorus $66.00 per gross ton, f.o.b. Lyles, Tenn. Delivered Chicago, $73.78. High phosphorus charcoal pig iron is not being produced.

UNIVERSITY OF MICHIGAN LIBRARIES

Ferromanganese

78-82% Mn, Maximum contract base price, gross ton, lump size.

F.o.b. Birmingham	$162
F.o.b. Niagara Falls, Alloy, W. Va., Welland, Ont.	$160
F.o.b. Johnstown, Pa.	$162
F.o.b. Sheridan, Pa.	$160
F.o.b. Rockwood, Tenn.	$165
F.o.b. Etna, Pa.	$163

$2.00 for each 1% above 82% Mn; penalty, $2.00 for each 1% below 78%.

Briquets—Cents per pound of briquet, delivered, 66% contained Mn.

Carload, bulk	10.0
Ton lots	11.6
Less ton lots	12.5

Spiegeleisen

Contract prices gross ton, lump, f.o.b.

	16-19% Mn 3% max. Si	19-21% Mn 3% max. Si
Palmerton, Pa.	$61.00	$62.00
Pgh. or Chicago	65.00	66.00

Manganese Metal

Contract basis, 2 in. x down, cents per pound of metal, delivered.

96% min. Mn, 0.2% max. C, 1% max. Si, 2% max. Fe.

Carload, packed	35.5
Ton lots	37.0

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, cents per pound.

Carloads	32
Ton lots	34
Less ton lots	36

Low-Carbon Ferromanganese

Contract price, cents per pound Mn contained, lump size, delivered.

	Carloads	Ton	Less
0.07% max. C. 0.06% P, 90% Mn.	25.25	27.10	28.30
0.10% max. C	24.75	26.60	27.80
0.15% max. C	24.25	26.10	27.30
0.30% max. C	23.75	25.60	26.80
0.50% max. C	23.25	25.10	26.30
0.75% max. C, 7.00% max. Ci	20.25	22.10	23.30

Silicomanganese

Contract basis, lump size, cents per pound of metal, delivered, 65-68% Mn, 18-20% Si, 1.5% max. C.

Carload bulk	8.60
Ton lots	10.25
Briquet, contract basis, carlots, bulk delivered, per lb of briquet	10.0
Ton lots	11.6
Less ton lots	12.5

Silvery Iron (electric furnace)

Si 14.01 to 14.50 pct., f.o.b. Keokuk, Iowa, openhearth $84.00, foundry, $85.00; $84.75 f.o.b. Niagara Falls; Electric furnace silvery iron is not being produced at Jackson. Add $1.00 per ton for each additional 0.50% Si up to and including 18%. Add $1.00 for each 0.50 pct. Mn over 1 pct.

Silicon Metal

Contract price, cents per pound contained Si, lump size, delivered, for ton lots packed.

96% Si, 2% Fe	20.70
97% Si, 1% Fe	21.10

Silicon Briquets

Contract price, cents per pound of briquet, bulk, delivered, 40% Si, 1 lb Si briquets.

Carload, bulk	5.90
Ton lots	7.50
Less ton lots	8.40

Electric Ferrosilicon

Contract price, cents per pound contained Si, lump size, bulk, in carloads, delivered.

25% Si	17.50
50% Si	10.50
75% Si	13.00
85% Si	14.65
90-95% Si	16.50

Calcium Metal

Eastern zone contract prices, cents per pound of metal, delivered.

	Cast	Turnings	Distilled
Ton lots	$2.05	$2.95	$3.75
Less ton lots	2.40	3.30	4.55

Ferrochrome (65-72% Cr, 2% max. Si)

Contract prices, cents per pound, contained Cr, lump size, bulk, in carloads, delivered.

0.06% C	28.75
0.10% C	28.25
0.15% C	28.00
0.20% C	27.75
0.50% C	27.50
1.00% C	27.25
2.00% C	27.00
65-69% Cr, 4-9% C	20.50
62-66% Cr, 4-6% C, 6-9% Si	21.35

Briquets — Contract price, cents per pound of briquet, delivered, 60% chromium.

Carload, bulk	13.75
Ton lots	15.25
Less ton lots	16.15

High-Nitrogen Ferrochrome

Low-carbon type: 67-72% Cr, 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome price schedule. Add 5¢ for each additional 0.25% N.

S. M. Ferrochrome

Contract price, cents per pound chromium contained, lump size, delivered.

High carbon type: 60-65% Cr, 4-6% Si, 4-6% Mn, 4-6% C.

Carload	21.60
Ton lots	23.75
Less ton lots	25.25

Low carbon type: 62-66% Cr, 4-6% Si, 4-6% Mn, 1.25% max. C.

Carload	27.75
Ton lots	30.05
Less ton lots	31.85

Chromium Metal

Contract prices, cents per lb. chromium contained packed, delivered, ton lots. 97% min. Cr. 1% max. Fe.

0.20% max. C	1.09
0.50% max. C	1.05
9.00% min. C	1.04

Calcium—Silicon

Contract price per lb. of alloy, lump, delivered.

30-33% Ca, 60.65% Si, 3.00% max. Fe.

Carloads	17.90
Ton lots	21.00
Less ton lots	22.50

Calcium—Manganese—Silicon

Contract prices, cents per lb of alloy, lump, delivered.

16-20% Ca, 14-18% Mn, 53-59% Si.

Carloads	19.25
Ton lots	21.55
Less ton lots	22.55

CMSZ

Contract price, cents per pound of alloy, delivered.

Alloy 4: 45-49% Cr, 4-6% Mn, 18-21% Si, 1.25-1.75% Zr, 3.00-4.5% C.

Alloy 5: 50-56% Cr, 4-6% Mn, 13.50-16.00% Si, 0.75 to 1.25% Zr, 3.50-5.00% C.

Ton lots	19.75
Less ton lots	21.00

V Foundry Alloys

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. V-5: 38-42% Cr, 17-19% Si, 8-11% Mn. V-7: 28.32% Cr, 15-21% Si, 14-16% Mn.

Ton lots	15.75¢
Less ton lots	17.00¢

Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. Si 56%, Ti 9%, Ca 5%.

Ton lots and carload packed	18.00¢
Less ton lots	19.50¢

SMZ

Contract price, cents per pound of alloy, delivered. 60-65% Si, 5-7 Mn, 5-7% Zr, 20% Fe, ½ in. x 12 mesh.

Ton lots	17.25
Less ton lots	18.50

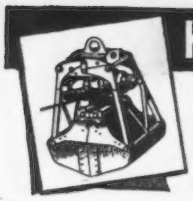
Other Ferroalloys

Ferrotungsten, standard, lump or ¼ x down, packed, per pound contained W, 5 ton lots, delivered	$2.25
Ferrovanadium, 35-55%, contract basis, delivered, per pound, contained, V.	
Openhearth	$2.90
Crucible	3.00
High speed steel (Primos)	3.10
Vanadium pentoxide, 88-92% V_2O_5 contract basis, per pound Contained V_2O_5	$1.20
Ferrocolumbium, 50-60% contract basis, delivered, per pound contained Cb.	
Ton lots	$2.75
Less ton lots	2.80
Ferromolybdenum, 55-75%, f.o.b. Langeloth, Washington, Pa., per pound contained Mo.	95¢
Calcium molybdate, 45-50%, f.o.b. Langeloth, Washington, Pa., per pound contained Mo.	80¢
Molybdenum oxide briquets, f.o.b. Langeloth and Washington, Pa., per pound contained Mo.	80¢
Molybdenum oxide in bags, f.o.b. Langeloth and Washington, Pa., per pound contained Mo.	80¢
Ferrotitanium, 40-45%, 0.10% C max., f.o.b. Niagara Falls, N. Y., ton lots, per pound contained Ti	$1.23
Ferrotitanium, 20-25%, 0.10% C max., ton lots, per pound contained Ti	$1.40
Less ton lots	1.45
High carbon ferrotitanium, 15-20%, 6-8% C, contract basis, f.o.b. Niagara Falls, freight allowed, carloads, per net ton	$160.00
Ferrophosphorus, electrolytic, 23-26%, carlots, f.o.b. Siglo, Mt. Pleasant, Tenn., $3 unitage, per gross ton	$65.00
10 tons to less carload	75.00
Zirconium, 35-40%, contract basis, f.o.b. plant, freight allowed, per pound of alloy.	
Ton lots	21.00¢
Zirconium, 12-15%, contract basis, lump, delivered, per pound of alloy.	
Carload, bulk	6.60¢
Alsifer, 20% Al, 40% Si, 40% Fe, contract basis, f.o.b. Suspension Bridge, N. Y.	
Carload	8.40¢
Ton lots	9.30¢
Simanal, 20% Si, 20% Mn, 20% Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per pound	
Carload, bulk	11.00
Ton lots, packed	11.25
Less ton lots	11.75

Borron Agents

Contract prices per pound of alloy, delivered.

Ferroboron, 17.50% min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C, 1 in. x D.	
Ton lot	$1.20
Manganese—Boron 75.00% Mn, 15-20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. X D, delivered.	
Ton lots	$1.67
Less ton lots	1.79
Nickel—Boron 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, delivered.	
Less ton lots	$1.80
Silcaz, contract basis, delivered.	
Ton lots	45.00¢
Grainal, f.o.b. Bridgeville, Pa., freight allowed, 100 lb and over.	
No. 1	93¢
No. 6	63¢
No. 79	45¢
Bortam, f.o.b. Niagara Falls	
Ton lots, per pound	45¢
Less ton lots, per pound	50¢
Carbortam, f.o.b. Suspension Bridge, N. Y., freight allowed, Ti 15-18%, B 1.00-1.50%, Si 2.5-3.0%, Al 1.0-2.0%.	
Ton lots, per pound	8.625¢
Borosil, f.o.b. Philo, Ohio, freight allowed, B 3-4%, Si 40-45%, per lb contained B	$6.25



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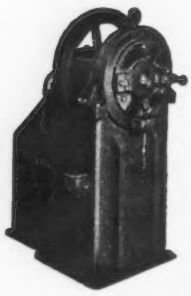

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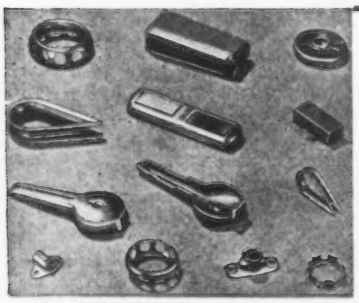

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INCO Directors Visit in Canada

Ontario

• • • **Seventeen directors** of the International Nickel Co. of Canada Ltd. from the United States, Canada and Great Britain recently made an inspection trip covering the company's mines and plants in the nearby Sudbury district.

Photo of the directors was taken at Copper Cliff. Reading from left to right:

Front Row, H. R. MacMillan, C.B.E., of Vancouver, president, H. R. MacMillan Export Company, Ltd.; the Rt. Hon. Viscount Weir of Eastwood, P.C., G.C.B., of Glasgow, Scotland, chairman, G. & J. Weir, Ltd.; Reg Halladay, of Cresskill, N. J., senior partner in the investment firm of Halladay & Co.; Robert C. Stanley, of Dongan Hills, N. Y., chairman of the board and president of International Nickel; Dr. John F. Thompson, of New Canaan, Connecticut, executive vice-president of International Nickel; and James S. Duncan, of Toronto, president, Massey-Harris Co. Ltd.

Second Row, R. Leslie Beattie, of Copper Cliff, vice-

president and general manager in charge of Canadian operations of International Nickel; Ross H. McMaster, of Montreal, chairman, The Steel Co. of Canada, Ltd.; John P. Bickell, of Toronto, chairman, McIntyre-Porcupine Mines, Ltd.; Laurance S. Rockefeller, of New York, president of Rockefeller Bros., Inc.; Sir William T. Griffiths, of London, England, vice-president of International Nickel in charge of operations in Great Britain and European activities; and Dr. Donald Hamilton McLaughlin, of Berkeley, Calif., president, Homestake Mining Company.

Third Row, the Rt. Hon. Viscount Margesson of Rugby, P. C., of London, England; H. C. F. Mockridge, of Toronto, member of the firm of Osler, Hoskin & Harcourt, Canadian counsel of International Nickel; William J. Hutchinson, of Peapack, N. J., Treasurer of International Nickel; Henry S. Wingate, of New York, Secretary of International Nickel; and Grant B. Shipley, of Pittsburgh, chairman, Elliott Co.

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Chicago

• • • **Over 500 commercial** vehicle fleet representatives recently heard discussions on gears which will last up to 20 times longer than conventional ones, high compression engines to increase fuel economy by 30 pct and aluminum coated mufflers at the victory award luncheon conducted by the National Safety Council.

The spokesman for the affair was W. J. Davidson, Detroit, executive engineer for General Motors. General Motors also was sponsor for the luncheon.

Mr. Davidson's subject was "New Motor Horizons." He talked about research and enginering projects now under way which are aimed at greater efficiency and economy in the motor vehicles of tomorrow.

While considerable progress has been made on these new developments, Mr. Davidson emphasized that unforeseen research problems could delay perfection of any one of them for some time to come.

Also just over the horizon for greater motoring comfort and efficiency, Mr. Davidson mentioned: new ways of making parts from gray iron castings with walls so thin that the weight of the parts will compare favorably with pressed steel or aluminum, and yet have the rugged strength and life of cast iron; new types of alloy steel, through research which saves critically short alloy materials and yet develops stronger metals; and a new method of securing brake lining to the brake shoe which requires no rivets and permits almost the entire lining to be used up without scoring the brake drum.

Feels Freight Rates Are Still Low

Boston

• • • **Present day** freight and passenger rates are still relatively low despite recent increases, according to Robert M. Edgar, assistant to the president of the Boston and Maine R. R. Co.

"That the price of railroad transportation has remained relatively low in this country is something which I think has been overlooked by most people," Mr. Edgar said. Because of the fact that railroad freight rates and passenger fares are subject to regulation by public authority and because of the long drawn out hearings and the publicity that attends a petition for increased rates, an impression is created that these rates have gone up more often and faster than they actually have. The average revenue per ton mile for the nation as a whole was 1.076¢ in 1947, and 1.275¢ in 1921.

"The energies which once were devoted to building and expansion today must be devoted to the meeting of competition from the automobile, the bus, and the truck, operated over magnificent publicly-owned highway systems, and the increasingly serious battle with rising costs."

In speaking of the improved facilities of the railroads that represent an investment giving the railroad business one of the highest investments per employee of any industry, he declared, "The fact that a ton of freight is actually moved by rail in this country today, despite a recent increase, for only a little more than 1¢ per mile, illustrates very plainly the effect of the investment that has been made in railroads. This investment provides each worker with

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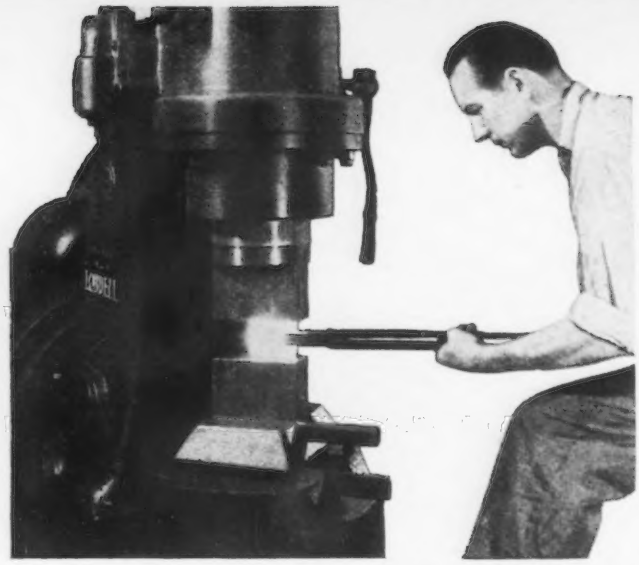

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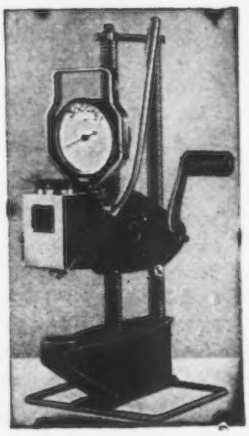

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$20,265 worth of tools, such as cars, engines and trucks which greatly multiply transportation output."

In speaking of the necessity for an adequate rate of return on investment in railroads, he said, "Despite the recording-breaking volumes of traffic and gross revenues, the net return on the investment continues dangerously low. In 1947, it was less than 3½ pct. Out of this must come money for improvements, reserves for the future, and a return on their investment to the stockholders who are the owners of the property. What this means is that the credit of the industry is poor and when this situation exists it is impossible to sell stock to finance improvements. To have to take money out of earnings to make improvements that should be financed by investment from outside is unsound."

Canada's Nonferrous Exports Increase

Ottawa

• • • **Canadian exports** of nonferrous metals and products in August increased in value to $34,257,000 from $25,589,000 in August, 1947, according to the Dept. of Trade and Commerce. For the first 8 months this year exports had total value of $255,325,000 compared with $197,471,000 for the corresponding period last year.

Exports of nonferrous metals for the first 8 months of 1948 and 1947 were as follows:

Exports of Nonferrous Metals

EIGHT MONTHS	1948	1947
Aluminum & products	$ 70,198,000	$ 41,926,000
Brass & products	3,169,000	2,200,000
Copper & products	49,917,000	35,129,000
Lead and products	19,526,000	19,124,000
Nickel	48,961,000	40,830,000
Precious metals	17,397,000	16,738,000
Zinc & products	24,191,000	20,136,000
Electrical apparatus	11,447,000	13,141,000
Other non-ferrous prods.	10,518,000	8,249,000
Total 8 Months	$255,325,000	$191,471,000

Blast-Furnace Slag Hits New High

Washington

• • • **In 1947** iron blast-furnace slag processed for commercial uses reached a new high of 19,581,679 short tons valued at $19,525,482, a figure 17 pct above the 16,706,792 tons valued at $14,869,839 in 1946. These statistics are based on a canvass conducted by the National Slag Assn., of the 38 companies operating 58 plants that prepare iron blast-furnace slag for commercial use. The results of this canvass were assembled in cooperation with the Bureau of Mines, U. S. Dept. of the Interior.

Screened air-cooled slag, the major product, reached a total of 16,712,177 short tons, an increase of 17 pct over the 1946 figure. Of this total, 15,426,367 tons, or 92 pct, was used as railroad ballast, as aggregate in portland cement concrete, bituminous construction of all types, miscellaneous highway construction uses, and in the manufacture of concrete block.

The balance of the screened air-cooled slag was consumed in the manufacture of mineral wool, roofing granules, sewage filters, agricultural and other uses.

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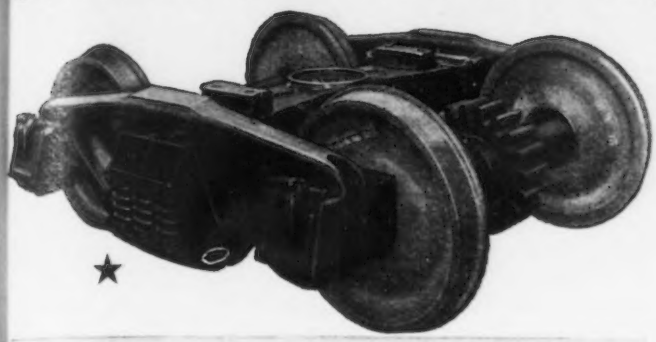

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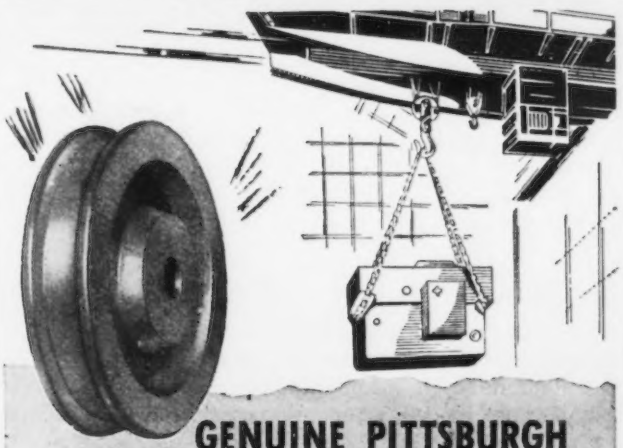

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Domestic Lead Consumption Falls

New York

• • • **Domestic lead** consumption fell from 84,622 tons in June to 70,501 tons in July, a decline of 16 pct, according to the Bureau of Mines, U. S. Dept. of the Interior. The average daily consumption was 2274 tons compared with an average daily rate of 2926 tons in the first 6 months of 1948 and 2821 tons in June.

Of the total lead consumed, 77 pct was used in the manufacture of metal products, 10 pct in pigments, 10 pct in chemicals including tetraethyl fluid and 2 pct in miscellaneous and unclassified uses. Lead consumed in the production of leaded zinc oxide, most of which was contained in lead ore treated directly without first being reduced to metal, totaled 1549 tons.

Refined soft lead, including some secondary as well as primary lead, accounted for 60 pct of the remaining 68,952 tons consumed, antimonial lead for 24 pct and scrap and lead in alloys 16 pct.

Domestic consumption of all grades of lead totaled 532,297 tons in the January-June period of 1948 with March showing the highest consumpion of 97,376 tons and May the lowest in this period with 80,978 tons used.

Consumers' stocks of lead increased 16 pct during the month. Stocks of refined lead were 27 pct higher on July 31, 9 pct higher in antimonial lead and 20 pct higher in lead content of scrap.

Imports of lead in July increased 57 pct over the June figure and were the highest yet recorded in 1948. Of the 30,851 tons imported, 78 pct was in the form of pigs and bars most of which came from Mexico. Canada, and Australia in the order named. Ore and concentrates accounted for 18 pct of total imports, originating mostly in the Union of South Africa, Bolivia, and Peru, and reclaimed scrap the remaining 4 pct. No base bullion was imported in July.

Canadian Pig Iron Output Decreases

Toronto

• • • **Canadian pig iron** production dipped slightly in September to 182,465 net tons for a daily average of 80.9 pct of total capacity, compared with 191,383 tons in August when the daily rate was 82.1 pct, and with 169,630 tons or 72.7 pct for September, 1947. For the month under review production included 145,281 tons of basic iron of which 139,068 tons were for further use of producers and 6213 tons for sale; 20,635 tons of foundry iron with 4112 tons for further use and 16,523 tons for sale and 16,549 tons of malleable iron, all for sale.

Charges to blast furnaces in September included 322,520 tons of iron ore; 44,533 tons of mill cinder, scale, sinter, etc., and 6908 tons of scrap. Twelve of the 14 furnaces in Canada maintained production throughout the month.

For the first 9 months this year production of pig iron totaled 1,593,481 net tons, which compares with 1,466,814 tons for the corresponding period of 1947 and 1,032,067 tons in 1946.

Production of ferro-alloys in September amounted to 12,318 net tons, against 12,700 tons in the previous

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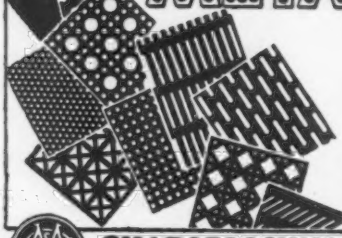

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month and 11,152 tons in September last year. For the month under review production by tonnage included, ferrosilicon, silicomanganese, ferromanganese, ferrochrome, chrom-x and ferrophosphorus.

In the 9 months ending with September cumulative production of ferroalloys totaled 127,610 tons compared with 112,702 tons in the 1947 period and with 87,411 tons in 1946.

Following are comparative monthly production figures for pig iron and ferroalloys for 1947 and 1948 in net tons:

1947	Pig Iron	Ferroalloys
January	177,313	9,644
February	150,632	9,357
March	164,403	14,197
April	160,749	13,015
May	160,230	15,325
June	159,826	16,212
July	157,153	12,402
August	166,878	11,398
September	169,630	11,152
October	163,335	14,691
November	174,147	11,551
December	165,551	10,888
Total	1,969,847	149,832

1948	Pig Iron	Ferroalloys
January	160,042	17,125
February	151,123	11,823
March	172,675	14,293
April	170,785	14,474
May	193,305	18,436
June	183,763	13,502
July	187,940	12,939
August	191,383	12,700
September	182,465	12,318
Total 9 Months	1,593,481	127,610

Compares Solution Vapor Pressures

Washington

• • • **A differential manometer** that will direct pressure differences as small as 1-millionth of an atmosphere over a range of total pressure from 1 mm of mercury to 1 atmosphere has been developed by Harry Matheson and Murray Eden of the National Bureau of Standards.

This instrument, which operates on the principle of the aneroid barometer can be used to compare pressures of gases, organic vapors, and noncorrosive liquids. It is particularly useful in vapor-pressure work since less than a drop of liquid is sufficient to compare an unknown vapor pressure as a function of temperature with that of a known liquid.

The rest point of the new manometer is insensitive to temperature, and accidental pressure differences as high as an atmosphere introduce only temporary hysteresis effects. The instrument is also readily portable and need not be leveled before operation.

A number of devices for measurement of absolute vacuum or pressure differences have been available to the laboratory worker. However, the majority of such gages do not operate satisfactorily in the presence of vapors.

Other common disadvantages are large dead volume, inconvenience of handling or moving, difficulty or slowness of manipulation, lack of precision, and sensitivity to temperature.

In connection with a study at the National Bureau

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